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THE LONDON GAS COMPANIES.

The gas companies of London appear to be panic-stricken at what they are pleased to call an interference with their "vested rights." From the tone assumed by the deputation which waited upon the Metropolitan Board of Works in reference to the proposed public improvement, for which that body are seeking Parliamentary powers, one might almost be led to believe that the streets of the Metropolis are the freehold property of gas and water companies, while the ratepayers, who pay for paving, lighting, and cleansing them, together with their representatives at the Board of Works, are expected to move on in the style of their forefathers. So far back as 1828, the late John Williams published his "Historical Account of Subways in the British Metropolis for the Flow of Pure Water and Gas into the Houses of the Inhabitants, without Disturbing Pavements." The same subject was afterwards thoroughly analyzed in a very able work from the pen of Mr. Newlands, the borough engineer of Liverpool, in 1853; but strange to say, nothing has yet been done in this country to carry into effect this most necessary improvement, until the matter was taken up by the Metropolitan Board of Works. It is a well-known fact that the gas companies of London have lost nearly one-third of the gas manufactured, in transmitting it through the street mains from their works to the consumers. It is also a fact that these escapes of gas have so impregnated the soil as to contaminate the atmosphere and affect the health of the people in the districts through which it has to flow.

This is an evil which ought not to exist; and the Board of Works are about to ask Parliament for powers to construct subways or tunnels, in which gas and water pipes may in future be placed, with the view of promoting sanitary progress, and of lessening the cost of repairing the streets, and the annoyance to trade so frequently caused by the laying of gas-pipes upon the present system. Everybody knows when a gas-pipe is being repaired. The offensive effluvia tells its own tale, but few people take time to consider the cause of it; and as the gas companies charge every foot of this wasted gas to their customers, they are actually shutting their eyes to the benefits of a project which, if carried out, would enable them to sell gas, at present wasted and lost, that would increase their incomes to an almost fabulous extent. In 1863, the gas supplied in London cost £1,496,569 15s., and the quantity of gas lost through leakage and waste would have sold in the market for about £500,000. With the improved subways, leakage can scarcely occur.

Common experience tells us, that where iron gas-pipes are laid in dry tunnels, oxidation is not so rapid, while escapes, except through defective workmanship, are almost unheard of; the scheme, therefore, of the Board of Works is worthy of the most weighty consideration, and cannot fail to meet with general support. In the days of oil-lamps, when the old Charley, in his watch-box, was king of the streets, such an opposition as the one promoted last week by the London gas companies might perhaps have been entertained, but in this advanced age subways for the gas and water-pipes of the Metropolis are an actual necessity, and without them the main drainage, the embankment of the Thames, and other improvements now in progress can scarcely be considered complete. It is said that if gas were to escape in these subways an explosion would be inevitable, while the workmen of the gas, water, and telegraph companies would be brought in contact, and would injure their several pipes, and thus cause an escape of gas which could not fail to be destructive of life and property.

This really reminds us of the early days of gas-lighting, when gasometers were enclosed within stone walls, and when Sir Humphrey Davy prophesied that the streets of London were as likely to be lighted with gas as that the dome of St. Paul's would be turned into a gasometer. Forty years of experience have proved that the pioneers of gas-lighting were right when they told the Committee of Parliament that no danger need be apprehended where proper precautions were taken, and where due vigilance was exercised in the manufacture and distribution of gas. It is the same now, and no more danger need be feared from the laying of gas-pipes in subways, than from the lighting of the Thames Tunnel or the railway tunnels at the terminuses at Liverpool or Glasgow. The deputation from the gas companies to the Board of Works, first of all based their objections on the ground of the injury to the public from explosions, but they subsequently turned them into a matter of pounds, shillings, and pence, by modestly suggesting that if their pipes were removed at all, it ought to be at the expense of the public. The Board of Works proposed to charge a small rent for the use of the subways, and as an immense saving will accrue by the adoption of the new plan, the gas companies of London ought to pay for it. It is just possible that we shall be able to show that the saving effected by them, in leakage alone would produce a revenue equal to five per cent. on the expense of relaying the entire Metropolis from end to end with new mains and service-pipes. Let the gas companies then sink their prejudices, and move on with the stream of improvement for the public good, or else give up their trade altogether. A very little unreasonable opposition on their part would promote such a result. In ten years their shares have nearly doubled in value, and they seem to think that they should not only secure ten per cent. dividend upon wasted capital, but enjoy a monopoly in finding money, from time to time, for additions to their works, to meet the increasing requirements of the consumers, upon which this large rate of interest shall be exacted.

The city authorities have frequently expressed their willingness to take the initiative in such a movement, and it is just possible that the gas-works of London, like those of Manchester, may become the property of the public, instead of being in the hands of those whose primary consideration appears to be large dividends, whether they have fairly earned them or not. It is well known that London gas is the dearest and poorest gas in the kingdom, and where speculation and profit exists unstimulated by competition, this state of things seems likely to continue. The Manchester Corporation make about £40,300 a year out of their gas-works, and yet their gas, which burns nearly twice as long, and gives as much light as London gas, is only three shillings and sevenpence per thousand feet. Let the Metropolitan Board of Works thoroughly sift this question, and unite with the Corporation of London, and they will soon save the ratepayers at least five hundred thousand pounds a year! This is no fancied theory, because the quality of gas may be improved, and the consumer will not burn so much of it. In Manchester, a burner consuming three feet of gas per hour will give more light than the common gas of London with a burner consuming five feet per hour. In the event of opposition, the local authorities might buy up the gas companies, and after paying them cent. per cent., by way of profit on the original cost of their shares, immense advantages might be gained by the public. The plan is simple enough, and if gas companies—who seem to think that they ought to oppose any public improvement which might have a tendency to reduce their dividends below ten per cent., we cannot see why their shares should not be purchased by the Board of Works and Corporation of London at their *present market value*, and converted into debentures, as in the case of the Glasgow Water-Works, bearing interest at the rate of five per cent. per annum. Such an arrangement would benefit all parties, because each one hundred pounds' worth of stock, with a certain five per cent. dividend, would soon arrive at a premium. On the other hand, the public would be gainers, through doing away with jobbery, the cost of management, and by securing money for all new and additional works at about four per cent. per annum, instead of paying ten per cent. to the existing companies. In a few years additional gas-works will be needed, and, *as the consumption of gas, even at high prices, is doubled about once in seven years*, it is only fair to suppose that with low prices its increase would be at a still higher ratio, and that it would become an agent of civilization and improvement, through finding its way into the houses of all classes of the community.—*Sanitary Reporter.*

EDINBURGH vs. LONDON GAS.

At Edinburgh cannel gas is made. It has an illuminating power of rather more than 32 candles, or is just twice as rich as the gas made by the Manhattan Gas-Light Company, of this city. The price of this gas in Edinburgh is 4s. 7d. per thousand cubic feet. In London the gas will not average over 12 candles, and the price charged for it is 4s. 6d. per thousand feet.

According to the Edinburgh standard of price, 12 candle gas ought to be sold in London at 1s. 9d. per thousand cubic feet. Cannel gas is supplied in some parts of London at 6s. per thousand, but it is said to be of "wretched" quality when compared with the Edinburgh cannel gas. A correspondent of the London *Sanitary Reporter*, who furnishes the above items, evidently thinks that the London gas companies need a thorough overhauling. We know that the people of this city would not submit to being served with such trash as gas of only 12-candle power.

The writer above referred to, assumes that 5s. per thousand cubic feet for 32-candle gas, would enable the companies of London to pay 10 per cent. dividends. He calls upon Mr. Romans, who occupies the position of analyst of the Edinburgh gas, to favor the readers of the *Sanitary Reporter* with his opinions on the subject. Mr. Romans could doubtless say many things which the London companies would prefer should remain unknown to the public.

MUSIC AND PETROLEUM LAMPS.—The *Messager*, of Ixelles, Belgium, contains a strange account of some experiments which it affirms have taken place in that town, to show the effect produced by music on petroleum lamps. That journal asserts that they are at once extinguished by a certain note sounded on a brass instrument. "During a quatuor," it says, "three or four lamps, placed in different parts of the room, went out simultaneously, and M. Duhem, professor at the Brussels Conservatoire of Music, extinguished eight lamps successively by the sound of a trumpet."

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	$ 50	....	....	
1856	AKRON	O.	20 000	50¼	—	Do.	5,500	3 00	....	....	
1845	ALBANY	N. Y.	25 . 00	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 50	....	....	
1851	ALEXANDRIA	Va.	106,580	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	4 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	9 00	....	....	
1859	ALTOONA	Pa.	40,000	50	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1856	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1848	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	150,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	3	Do.	9,000	6 00	....	....	
1858	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	....	Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1860	AURORA	Ind.	10,000	—	—	Private Works.	3 500	3 50	....	....	None for sale.
1817	BALTIMORE	Md.	556,000	100	5	June & December.	150,000	2 50	150	....	
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1858	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	....	....	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.	....	....	....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	....	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1853	BINGHAMTON	N. Y.	50,000	50	3½	Do.	10,000	4 00	....	....	
1859	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6,000	4 00	....	....	
1853	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	130,000	3 25	....	....	
1859	BRATTLEBORO'	Vt.	21,000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	....	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	25,000	50	3	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1858	BROOKLINE	Mass.	66,000	100	2½	February & August.	3,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.	....	....	....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 50	140	125	
1856	BURLINGTON	N. J.	100,000	25	3½	Do.	5,000	4 00	105	....	
1856	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1850	BURLINGTON	Iowa.	65,000	50	—	Do.	6,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	2 50	....	....	
1852	CAMBRIDGE	Mass.	800,000	100	5	February & August.	20,000	3 50	100	97½	
1852	CAMDEN	N. J.	800,000	100	3	April & October.	15,000	2 85	105	100	
1838	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,000	50	6	March & September.	6,000	3 00	....	....	
1858	CAPE ISLAND	N. J.	60,000	100	—	October.	10,000	6 00	....	....	Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1853	CARLISLE	Pa.	80,000	25	—	January & July.	4,000	4 00	....	....	
1854	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1856	CATSKILL	N. Y.	—	—	—	Private Works.	3,000	4 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	20,000	25	—	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	723,800	25	4	Do.	50,000	4 00	....	....	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	....	....	
1856	CHARLOTTE	N. C.	14,000	50	10	March & September.	5,500	6 00	....	....	
1859	CHARLOTTESVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	....	
1851	CHELSEA	Mass.	100,000	100	3½	January & July.	6,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,500,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.	....	4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	3 50	....	....	
1850	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	135,000	3 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—	....	....	....	....	....	
	CLARKSVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20,000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	....	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	....	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 00	....	....	Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	2,500	4 00	95	....	
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	....	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1856	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30,000	3 00	....	....	
1858	CONCORD	N. H.	30,000	50	5	Do.	8,000	3 50	....	....	
1856	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28,000	4 00	....	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	....	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	5,000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	3 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	....	
1858	DEDHAM	Mass.	40,000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellent tock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	2,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,500	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.	....	....	....	....	
1857	DOWLESTOWN	Pa.	30,000	—	—	Do.	2,000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	3½	Do.	17,000	4 50	....	115	This stock is wanted at par.
1856	EAST BOSTON	Mass.	183,000	25	4	Do.	20,000	3 50	....	145	
1856	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	....	No transactions.
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 00	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	8,000	4 00	....	....	
1856	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	....	
1852	ERIE	Pa.	68,000	50	3½	June & December.	10,000	3 00	....	....	
1858	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	A very good Company.
	EXETER	N. H.	60,000	—	—	Do.	12,000	....	....	....	
	FAIR HAVEN	Ct.	30,000	25	—	Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	96,800	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7,000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	56,800	25	—	Do.	10,000	4 00	....	....	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1858	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	30,000	50	1½	March & September.	6,500	4 00	....	....	
1858	FOLSOM	Cal.	....	....	....	....	....	....	....	....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6,000	4 00	....	....	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5,500	4 50	....	....	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2,000	4 00	....	....	Unlimited supply of Natural Gas.
1856	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Fremont	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	Fulton	N. Y.	12,000	100	—	— Do.	4,000	7 00	....	....	
1855	Galena	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	Galion	O.	25,000	25	—	January & July.	1,500	8 00	....	....	
1858	Galveston	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	Gardiner	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	Geneva	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	Germantown	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	Gettysburg	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	Glenn's Falls	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	Gloucester	Mass.	40,000	50	—	January & July.	5,000	3 50	....	....	
1857	Gloversville	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	Grand Rapids	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	Great Barrington	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	Great Falls	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	Greenfield	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	
1858	Greenpoint	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	Close corporation.
1859	Greensboro'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	Greensburg	Pa.	30,000	25	3	May & November.	2,000	8 00	....	....	
1854	Hagerstown	Md.	15,000	50	—	January & July.	2,000	6 00	....	....	
	Hamilton	O.	15,000			Do.			....	....	
1859	Hannibal	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1857	Harlem	N. Y.	250,000	50	3½	Do.	25,000	3 00	....	145	
1855	Harrisburg	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
1849	Hartford	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	
	Hastings	N. Y.				Do.	8,000	4 00	....	....	Stock in demand.
1858	Haverhill	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	Haverstraw	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	Hayesville	Mass.	15,000	25	—	Do.	4,000	4 00	....	....	
1859	Hempstead	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	Hoboken	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	
1856	Hollidaysburg	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	Works not yet built.
1861	Holyoke	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	Homer & Cortlandt	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	Honesdale	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1860	Hornellsville	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1853	Hudson	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	Hunter's Point	N. Y.							....	....	
1857	Huntington	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	Huntsville	Ala.	7,925	25	—	June & December.	2,000	5 00	....	....	
	Indianapolis	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1857	Iowa City	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	Ithaca	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	Jackson	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	Jackson	Miss.	30,000	50	—	Do.	4,000	4 50	....	....	
	Jackson	Cal.	50,000	20	—	Do.	4,000	10 00	....	....	
	Jacksonville	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	Jacksonville	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	Jacksonville	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	Jamaica	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1858	Jamaica Plain	Mass.	75,000	100	3½	Do.	3,000	3 50	....	....	
	Jamestown	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	Janesville	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	Jeffersonville	Md.	30,000	25	—	Do.	4,000	4 00	....	....	
1853	Jersey City	N. J.	300,000	—	5	Do.	80,000	3 00	150	....	
1858	Jersey Shore	Pa.	15,000	25	—	Do.	2,000	3 70	....	....	No sales since formation of Hoboken Co.
1856	Johnstown	Pa.	80,000	25	3	Do.	3,000	3 00	....	....	
1857	Joliet	Ill.	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	Kalamazoo	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	Keene	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	Keokuk	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	Kingston	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	Kittanning	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	
1854	Knoxville	Tenn.	68,000	—	—	April & October.	4,000	5 00	....	....	Said to be a fraud.
1860	Laconia	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	La Crosse City	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	Petroleum and Wood Gas.
1854	Lafayette	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	Lambertville	N. J.	30,000	25	—	Do.	2,600	4 00	....	....	
1849	Lancaster	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	Lancaster	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	Lansinburg	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	Lawrence	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	Leavenworth	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	Lebanon	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	Le Roy	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	Lewisburg	Pa.	20,000	100	—	January & July.	4,000	4 00	....	....	
1852	Lewiston	Me.	100,000	100	3	Do.	10,000	3 20	....	....	
1856	Lewistown	Pa.	30,000	50	3	April & October.	3,000	3 10	....	....	
1858	Lexington	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1853	Little Falls	N. Y.	112,000	25	—	Do.	2,500	7 00	....	....	
1861	Little Rock	Ark.	30,000	—	—	Do.	5,000	6 00	....	....	
1859	Lockhaven	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	Lockport	N. Y.	100,000	20	—	Do.	4,000	4 00	105	....	
	Logansport	Ind.	40,000		5	April & October.	5,000	4 00	125	....	But $481,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1838	Louisville	Ky.	600,000	50	6	January & July.	80,000	2 50	....	....	
1849	Lowell	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	Lynchburg	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	Lynn	Mass.	55,000	50	4	Do.	20,000	4 00	....	....	
1859	Lyons	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	Macon	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	Madison	Ind.	100,000	25	6	Do.	10,100	3 50	....	....	
1855	Madison	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	Malden & Melrose	Mass.	50,600	25	3	February & August.	5,000	4 00	....	....	
1859	Manayunk	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	Manchester	N. H.	100,000	100	5	January & July.	25,000	3 00	....	....	
1830	Manhattan (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	Mansfield	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	Marblehead	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	Marlboro'	Mass.	30,000	—	—	Do.	8,000	4 00	....	....	
	Mauch Chunk	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	Marietta	O.	50,000	50	—	Do.	7,000	4 00	....	....	Stock firm.
1860	Marion	O.	12,000	25	5	April & October.	1,500	12 55	....	....	
1858	Marysville	Cal.	50,000	100	—	January & July.	4,000	2 50	....	....	
1857	Massilon	O.	30,000	25	—	Do.	5,000	3 00	....	....	
1855	Meadville	Pa.	29,500	25	—	Do.	4,000	3 50	....	....	
	Medina	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1850	Memphis	Tenn.	300,000	100	5	June & December.	12,000	5 00	....	....	
	Meriden	Ct.	30,000			Do.			....	....	
1859	Metropolitan (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	Middleboro'	Mass.	15,000	—	—	Private Works.	—	6 00	....	....	
1858	Middletown	Ct.	50,000	25	6	March & September.	5,000	3 80	....	....	Owned by G. T. Sutton.
	Middletown	N. Y.		25	—	Private Works.	3,000	3 00	....	....	
	Milford	Mass.	20,000	—	—	Do.	—	4 00	....	....	
	Milledgeville	Ga.	100,000	50	—	Do.		5 00	....	....	
	Milton	Pa.	16,000			Do.			....	....	
1847	Milwaukee	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	Mobile	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1856	Monroe	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	Montgomery	Ala.	100,000	25	6	February & August.	7,000	6 00	....	....	
1856	Montpelier	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	Morrisania	N. Y.	30,000	50	—	Do.	—	4 00	....	....	
1859	Morristown	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	Mount Holly	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	Mount Vernon	O.	50,000	100	—	Do.		4 00	....	....	
1857	Muscatine	Iowa.	50,000	100	—	January & July.	3,000	4 50	....	....	
1854	Nantucket	Mass.	30,000	100	3	February & August.	4,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	NASHUA	N. H.	45,000	50	3½	January & July.	10,000	$ 50	....	....	
1850	NASHVILLE	Tenn.	200,000	50	5	Do.	25,000	3 50	....	....	
1858	NATCHEZ	Miss.	46,000	50	—	Do.	20,000	5 00	....	....	
	NEVADA CITY	Cal.							....	....	
1859	NEW ALBANY	Ind.	200,000	50	3½	Do.	16,000	3 50	....	....	
1846	NEWARK	N. J.	362,000	50	5	Do.	45,000	3 62	180	....	Always a favorite stock.
1856	NEWARK	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	NEW BEDFORD	Mass.	180,000	100	5	Do.	15,000	2 90	102	....	Well managed and kept quiet.
1859	NEWBERN	N. C.	22,000	100	6	Do.	6,800	3 50	....	....	
	NEW BRITAIN	Ct.	30,000	20	5	Do.	3,000	4 00	....	....	
1851	NEW BRUNSWICK	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	NEWBURG	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	NEWBURYPORT	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	NEWCASTLE	Del.	32,300	10	3	Do.	4,000	4 00	90	....	
1847	NEW HAVEN	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1858	NEW LONDON	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	NEW ORLEANS	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1858	NEWPORT	R. I.	150,200	100	4	Do.	10,000	3 50	112	....	
1854	NEWTON & WATERTOWN	Mass.	300,000	100	2	Do.	10,000	4 00	....	....	
	NEWTON	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	NEWTON	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
	NEWTOWN	N. Y.									
1823	NEW YORK	N. Y.	1,000,000	50	5	May & November.	100,000	2 50	300	....	
1839	NIAGARA FALLS	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	NORFOLK	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1853	NORRISTOWN	Pa.	41,700	25	4	June & December.	8,000	3 50	....	....	
1855	NORTH ATTLEBORO'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	NORTHERN LIBERTIES	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	NORTH ADAMS	Mass.	25,000	—	—	March & September.	30,000	4 00	....	....	
1856	NORTHAMPTON	Mass.	35,000	25	5	January & July.	4,500	4 00	....	....	
1859	NORTH BRIDGEWATER	Mass.	16,000	100	4	June & December.	1,000	4 00	....	....	
1856	NORWALK	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1859	NORWALK	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	NORWICH	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	NORWICH	N. Y.	12,000	50	—	Do.	2,500	4 00	....	....	
1859	NYACK	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	OBERLIN	O.	10,000	—	—	Do.	1,200	4 00	....	....	
1855	OGDENSBURG	N. Y.	75,000	50	5	Do.	9,000	4 00	....	....	
1859	ORANGE	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	OSWEGO	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	Good works, built by Hoy, Jr., & Kennedy.
1855	OTTAWA	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	
1856	OWEGO	N. Y.	40,000	50	3½	Do.	5,600	4 00	....	....	
1860	OWENSBORO'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	PADUCAH	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	PAINESVILLE	O.	40,000	25	5	Do.	2,500	5 00	....	....	
1856	PALMYRA	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	PATERSON	N. J.	125,000	25	5	Do.	20,000	3 50	95	....	
1850	PAWTUCKET	R. I.	75,000	50	4	Do.	12,000	3 00	....	....	
1855	PEEKSKILL	N. Y.	31,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	PEEK YAN	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1850	PEOPLES', CHICAGO	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	What is this Company doing?
1855	PEORIA	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	
1852	PETERSBURG	Va.	120,000	—	5	January & July.	20,000	2 80	....	....	
1841	PHILADELPHIA	Pa.	3,000,000	50	—	City Works.	650,000	2 50	....	....	
1855	PIQUA	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	PITTSBURG	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	PITTSFIELD	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	PLACERVILLE	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	PLAINFIELD	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	PLATTSBURG	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1858	PLYMOUTH	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	PORT CHESTER	N. Y.	50,000	50	—	Do.	4,000	4 00	....	....	
1860	PORT JERVIS	N. Y.	20,000	100	—	Do.	3,000	4 10	....	....	
1849	PORTLAND	Me.	300,000	50	4	January & July.	30,000	3 00	....	....	
1859	PORTLAND	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	PORT LAVACCA	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	PORTSMOUTH	N. H.	70,000	100	3	April & October.	6,500	3 70	....	....	
1855	PORTSMOUTH	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	PORTSMOUTH	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	POTTSTOWN	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	POTTSVILLE	Pa.	110,000	50	3	Do.	10,000	3 50	....	....	
1850	POUGHKEEPSIE	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
1843	PROVIDENCE	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1858	QUINCY	Ill.	300,000	50	4	June & December.	12,000	3 50	....	....	
	QUINCY	Mass.	60,000	00	—	Do.	00,0 0	0 00	....	....	
1853	RACINE	Wis.	43,500	25	—	Do.	7,000	3 50	....	....	
1857	RAHWAY	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1856	RALEIGH	N. C.	25,000	100	6	May & November.	5,000	6 00	....	....	
1848	READING	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	RICHMOND	Va.	341,975	—	—	City Works.	30,000	3 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
1859	RICHMOND	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	
	RICHMOND COUNTY	N. Y.									
1859	RIPLEY	O.	25,000	50	—	April & October.	2,000	4 00	....	....	
1852	ROCHESTER	N. Y.	200,000	50	5	January & July.	50,000	2 50	....	....	
1857	ROCKFORD	Ill.	40,000	50	—	Do.	4,000	4 00	....	....	
1856	ROCK ISLAND	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	ROCKLAND	Me.	50,000	100	—	Do.	6,000	4 40	....	....	
1853	ROME	N. Y.	35,000	100	3½	Do.	10,000	3 60	....	....	
1854	RONDOUT and KINGSTON	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	ROXBURY	Mass.	150,000	100	5	January & July.	20,000	3 50	....	....	
1859	RUTLAND	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	SACO	Me.	71,600	100	3½	April & October.	3,000	4 60	....	....	
1857	SACRAMENTO	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	SAG HARBOR	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1856	SAINT ALBANS	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	SAINT JOHNSBURY	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	SAINT JOSEPH	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1839	SAINT LOUIS	Mo.	600,000	50	—	June & December.	180,000	3 50	....	....	
1857	SAINT PAUL	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	SALEM	N. J.	30,000	25	3	Do.	5,000	3 66	....	....	
1850	SALEM	Mass.	200,000	100	4	February & August.	30,000	3 24	....	....	
1859	SALEM	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	SALISBURY	N. C.	14,000	50	6	May & November.	2,500	6 00	....	....	
	SALISBURY MILLS	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	SALMON FALLS	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	SAN ANTONIO	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	SANDUSKY	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	SANDWICH	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1853	SAN FRANCISCO	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	SAN JOSE	Cal.									
1838	SARATOGA SPRINGS	N. Y.	39,600	100	—	January & July.	6,000	3 60	10	....	
	SAUGERTIES	N. Y.	20,000	20	—	Do.	4,000	3 00	....	....	
1849	SAVANNAH	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	SCHENECTADY	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1856	SCRANTON, Gas and Water	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	About trying Water-Gas.
1857	SELMA	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	SENECA FALLS AND WATERLOO	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	SHREVEPORT	La.	40,000	25	—	Del.	3,000	6 50	....	....	
1856	SING SING	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	SMYRNA	Del.						4 00	....	....	Petroleum Gas.
1840	SOUTH ADAMS	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1854	SOUTH BRIDGE	Mass.	5,000	25	—	Do.	4,210	6 00	....	....	
	SOUTH BOSTON	Mass.	200,000	50	—	Do.	60,000	3 25	110	....	
	SPRINGFIELD	O.	200,000	100	—	Do	20,000	3 50	....	....	
1854	SPRINGFIELD	Ill.	75,000	50	—	January & July.	10,000	3 50	....	....	
1848	SPRINGFIELD	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1855	STAMFORD	Ct.	6,250	25	3	April & October.	3,000	3 50	....	....	
1857	STATEN ISLAND	N. Y.	189,000	50	5	January & July.	26,000	4 20	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY, No. 39 NASSAU STREET, NEW YORK, DEALER IN GAS-LIGHT SHARES.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
18	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8,000	10 00	....	....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00	....	....	
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1850	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	8,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1859	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1853	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1860	Virginia City	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1853	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	2,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	....	100	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	....	
1848	Washington	Pa.	30,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	80,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10,000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2½	Do.	3,500	3 50	....	....	
	Westfield	Mass.	25,000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1856	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 30	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1856	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25	—	Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,500	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	8,000	4 00	....	....	
1854	Yonkers	N. Y.	100,000	50	3½	Do.	10,000	3 50	110	16½	
1849	York	Pa.	40,000	57	3	June & December.	10,000	2 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	....	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33 040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2½	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	60,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—	—	February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	40	7	May.	20,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1849	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1853	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	400,000	40	—	March & September.	110,000	2 80	....	118	Last sale at this figure.
1854	Ottawa	C. W.	40 000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15.000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	65	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1856	Sorel	C. E.	14,800	20	4	Do.	4,000	3 00	....	....	
1843	Toronto	C. W.	400,000	50	—		50,000	3 00	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	8 80	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfuegos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	6 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guines	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	35,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		....	....	
	Manzanas (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevideo	S. A.	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
1854	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	800,000	4 00	....	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25,000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	....	....	
	Vera Cruz	Mex.	500,000	—	—	Do.			....	....	
	Ville Clara	Cuba.	50,000	—	—	Do.			....	....	
	Auckland	N. Z.		—	—	Do.			....	....	

ON AIR-GAS,

As produced by the "Automatic Gas Machine," invented by MR. O. P. DRAKE, *of Boston.*

BY AUG. A. HAYES, M. D., STATE ASSAYER.

The readers of this journal are, doubtless, familiar with the results of many attempts which have been made in this country to burn atmospheric air, when mixed with the vapor of some hydrocarbons, for the purposes of illumination.

The plans and devices for this purpose have failed in some essential features, so far, that the application of this mode of obtaining light has been much restricted until lately. As there are some points of apparent interest in the present application, I have thought them deserving a permanent record, in connection with gas-lighting.

My attention was called to the subject of burning heavy hydrocarbon vapor, in mixture with air, soon after Mansfield's researches were published, and I have had some experience with all the more promising inventions which have been known in this country, as well as with Mr. Drake's earlier apparatus for the use of "Benzole" vapor. The successive improvements made in this direction have also been examined. More than a year since, Mr. Drake placed in my charge one of his automatic machines, and made all the required mechanical adaptations for a full experimental investigation of the subject, which consumed part of the time of four weeks.

The "Automatic Gas Machine" is an apparatus combining successive improvements and inventions, by which air is drawn in and passed over absorbing surfaces, greatly extended, and successively moistened withfluid hydrocarbons, called gasoleine. Power is obtained by the regulated descent of a weight, which causes a steady flow of gas, when a tap connected with the machine is opened. There is a regulating reservoir, and an arrangement for admitting air to mix with any rich mixture formed, in the way of dilution, when required. Although simple in construction, and easily managed by even ignorant persons, this machine cannot be fully described without reference to drawings.

The act of opening the tap connected with the burner gives rise to motion and the manufacture of the compound gas. The supply continues so long as a few ounces of fluid remain in the reservoir. Generally, the machine requires winding once a day, when all the burners have been used, and the reservoir ordinarily needs a new supply of gasoleine once each week.

Before entering on the investigation, arrangements were made for exposing the apparatus, as mounted and working, to the extremes of natural temperature above the freezing point of water, at which temperature the water in the machine would freeze. The mixed gas produced could, however, be cooled to zero F., and its temperature noted by the indications of a sensitive thermometer, immersed in the gas before it reaches the burner.

As the forming of this gas in the apparatus, by the rapid abstraction of vapor, is a cooling process, the inventor has made the provision of having a mass of water and fluid hydrocarbon always present, and hence little reduction of temperature ensues. Nor is there a separation of the more volatile parts of the gasoleine from the more fixed parts to any objectionable extent in practice.

This gasoleine is a mixture of volatile hydrocarbons, not belonging to the benzole series, and not subject to crystallization by great reduction of temperature. In the chemical experiments on this body, I was impressed by the close resemblance existing between the different fluids composing it, and the fluid forms of condensed gases, where pressure and low temperature induce a new mechanical state, while the resumption of the gaseous form is preceded by a vaporization. So important is this property of readily passing into vapor at a low temperature, and the kindred one of diffusing, at a point far below the lowest boiling point of the compound fluid, that the success of general application to forming the mixed gas is dependent on it. Even the skill and invention of Mr. Drake, connected with the use of fluids of the benzole series, for more than ten years, enabled him to successfully apply them in hot climates only. Most of the failures in enterprises of this kind, including that of "naphthalizing" poor coal gas, have also arisen from the injudicious selection of the hydrocarbons employed.

Gasoleine is a highly volatile mixture of hydrocarbons, which can be produced in great quantities from cannel coal, and is a secondary, or by-product, in refining petroleum oil, to some extent. At 60° F., this fluid has a sp. gr. of 0.6587. Assuming the standard gallon of water to weigh 132 oz., one gallon of gasoleine will weigh 86 94-100 ozs. In a distilling apparatus little ebullition takes place at 150° F.; at 212° F. more vapor is formed, but the fluid requires 240° F. for rapid distillation. With this high boiling point, which is inconstant, it entirely diffuses rapidly in air, or coal-gas, at 60° F. In the use of suitable vessels it may be handled and transported, with no more attendant danger than belongs to alcohol of the greater strength.

In the experiments, the permanency of the gas in relation to cold, the color of the light afforded as affecting colored fabrics; the influence of the flame on the organs of vision, and the economy of this mode of illumination, in comparison with other sources of light, were considered.

A "dead black" surface in the photometric room was secured, and the measurement of the light was made by means of a photometer, such as Bunsen uses, lent to me by Prof. Wm. B. Rogers, and, more carefully, by the modification adopted by Mr. King, of Liverpool. The burner used was one adapted to the compound gas, and sold with the apparatus. It was the ordinary Argand of thirty-two holes, each 1-32d of an inch diameter, and the chimney was six inches high. A regulated pressure of one-half an inch was adopted, after the gas left the standard meter, which registered 1-100 c. ft., and could be read closer. Sperm candles, burning 126 to 136 grs. per hour, were used for comparison, and the rate of combustion was determined for each set of ten observations, by weighing the lighted candle on the lapse of ten minutes. These experiments were continued from day to day, multiplying the observations, and varying the conditions, so as to reduce the influence of errors common in such trials.

Analysis of the compound gas was several times made, but the synthetical formation of the air gas afforded much more accurate results. For this purpose, the gas apparatus was so balanced that, although very heavy, a variation of a few grains in weight could be readily seen, and nearly every particle of matter entering into consumption could be estimated by weight.

Permanency of this Air Gas.

When gas formed at 59° F., supplying one light, was cooled near the burner to 14° F., the consumption being 3 58-100 feet per hour, the light was reduced to 2 9-10 candles, and flame was continued at lower temperatures. By allowing more gas to flow, six or seven cubic feet were consumed, and much more light afforded, so that no sudden extinguishment of the flame can occur.

Gas formed at 56° F. was allowed to pass the cooling apparatus reduced to 0. F. As the difficulty experienced in cooling a *current of gas*, even with large cooling surfaces, is well known, the point between 10° and 12° F. was fixed on, for the trials. Ten cubic feet passed in ninety-one minutes, and the light equalled that of one candle.

This reduction of temperature, being far below that which in practice would ever take place, proves the degree of permanency which can be expected from air gas. Where water remains fluid, it can be depended on for affording light, and when reduced below this point, it still burns with flame. Repetitions of this experiment were relied on for knowledge of the constitution of the gas passing. Thus, gas formed at 59° F. had, in consecutive trials for several days, a mean illuminating power of 18 5-10 standard sperm candles, when the usual reductions from less than four feet consumed, and 128 grs. of sperm burned, were made. This gas cooled to 10° F., 100 c. f., in passing, deposited 2 34-100 lbs. of gasoleine, which had a sp. gr. 0.6524 at 60° F., the normal density was 0.6587—the slight difference showing the almost equable diffusion at so low temperatures. Now, such gas, at 59° F., requires 3 58-100ths of gasoleine to form it, and as the difference, 1 24-100 lbs. of gasoleine passed the cooling medium, and barely gave luminosity in combustion to the flame, not only is the weight of the gasoleine necessary to full illumination known, but we can estimate nearly the amount consumed without producing any light. And it is to this point that, I think, some interest is attached, in connection with ordinary gas consumption and composition.

Air-gas is, therefore, so constituted, that a reduced temperature causes the deposition of fluid matter, which in practice rarely takes place, but is provided for, and, like coal gas, carries, at different temperatures, different amounts of illuminating vapor. Considered apart from this vapor, which it transports, it consists of a basic gas composed of nitrogen, oxygen, carbonic acid, and vapor of water, mixed with 1 24-100 lbs. in 100 c. f. of vapor of hydrocarbons. This basic gas burns freely at a jet, and affords heat with little light, the hydrocarbon vapor combining with the oxygen present in the basic gas, and also with that of the atmosphere, into which the jet of gas enters.

The first impression arising in the mind of every one of the *novel* character of a gas, formed of vapor of hydrocarbon and common air, disappears, when we more closely compare the constitution of the new gas with illuminating gas from coal. In ordinary gas, fully two-thirds of the light-giving power is dependent on the presence of vapors of hydrocarbons, and the degree of the *permanency* of such gas depends on the kind or quality of such vapors. Rarely do we meet with a coal-gas which will bear reduction of temperature to the point where water freezes, without suffering a great loss of illuminating power, from the condensation of vapors rich in carbon; and, although we permit ourselves to consider coal-gas as a permanent gas, in its physical relations, it ceases to be so in the economical and chemical applications in which we are viewing air-gas. Like air-gas, it consists of a mixture of gases, which may be called basic gases, and it carries different hydrocarbon vapors, which serve to give luminosity to the flame. When *wholly* deprived of these, the hydrogen, marsh-gas, carbonic oxide, and olefiant gas, in mixture, afford but little light in combustion.

Illuminating Power of Air-gas.

Eighteen series of five-minutes' observations had been made on gas produced at 60° F., and left six to thirty-six hours, passed over water, and burned at 60° F., 3 84-100 c. f. of gas burnt per hour. Candles consumed 133 5-10 grs. per hour. Ratio of light was 12 5-10 such candles for 3 84-100 ft., or 18 1-10 candles consuming 120 grs. each per hour, an equal to five c. f. This series included the time when the reservoir was partly exhausted of its supply of gasoleine. Mostly exhausted of gasoleine, gas flowing at 60° F. was 10 9-10 candles.

In this way, consuming 111 6-10 c. f., and completely exhausting the impregnating device, the illuminating power fell from 18 1-10 candles to an average of 11 1-10 candles.

Repeating these experiments, it was found that an average of seventeen-candle power was obtained from the half exhausted impregnating apparatus—a sufficient demonstration of the ability of the apparatus to meet a demand for gas, of more than ordinary light-giving quality.

In another series of experiments, the reservoir for gasoleine had been filled, and the gas which formed at 59° F. equalled nineteen standard sperm candles, when five cubic feet were consumed, as an average, for the series.

At higher temperatures, the gas produced has the character of pure cannel gas, and, as a consumption of 3 6-10 c. f. of gas, formed at 60° F., gives a flame sufficient for ordinary use, a corresponding reduction of volume for the richer gas must be made, with, perhaps, less economy at the burner.

To meet the contingency of a temperature higher than the mean occurring, and in climates nearer the equator, the device for mixing air with rich gas, in order to dilute it, forms a prominent economical feature of the machine. The *volume* of the gas being increased by the admission of air, the intensity of the

light at the burner is diminished to the economical point—a milder diffusible light being obtained—any excess of vaporization is thus prevented. In ordinary use, the machines are placed where the temperature, through the year, is nearly the mean temperature of the locality.

In a series of trials on gas, made at the temperature of 59° F., and afterwards cooled down to 38° F., the average illuminating power, in two days' use of the gas, was twelve standard candles, as the value of the light for 38° F. The series between 36° F. and 45° F. gave an average of 12 3-10 standard candles.

Gas formed at 59°, cooled several hours to 28° and 26° F., gave an average of 9 5-10 candles. At 32° F., the consumption of five c. f. per hour afforded light equal to 11 2-10 standard candles, showing the economy of burning five feet, as compared with four feet, burned at 38° F. A *résumé* of the results of the whole experiments places the following points in view:

At the mean temperature of this climate, which can be always secured in a dwelling, gas of eighteen candles' illuminating power can be surely and constantly obtained.

Below the "living temperatures" of 45° F., and as low as 35° F., gas equal in illuminating power to that supplied for consumption in London, can be depended on, as a constant product. At and below the temperature where water freezes, the gas, which flows continuously, has the power of nine candles. When reduced to 10° F., combustible gas passes, and can be burned for heat, with little light very little gasoleine being expended.

Economy of Air-gas.

Air-gas may be considered as offering a convenient mode of obtaining perfect combustion of heavy hydrocarbon vapors, with the advantages connected with the use of gas, for the purpose of illumination. The current of air carries the vapor to the opening of the burner, where it is burnt, and the supply of material must equal the demand for light.

The economy of the light was the chief object of the investigation undertaken. The utmost care was given to this point, and the multiplied observations, made on the value of the light during twenty days, included the circumstances likely to occur, in the daily use of the apparatus in dwellings, and the influence of varied rates of consumption.

When the gas was formed at 60° F.—all the apparatus and fluids being at that temperature—100 c. f. of the gas contained seven-tenths of one gallon of gasoleine. The cost of the material, affording 100 c. f. of eighteen standard-candle gas, was therefore seven-tenths of the price of one gallon of gasoleine. At the time the experiments were made, the price of gasoleine was twenty-five cents per gallon. Now, a higher price is charged for it, and a corresponding increase in the cost of the gas necessarily follows. Air-gas can never be produced at so low cost as coal-gas, in favorable locations, and, as an illuminating agent, it can never compete with it in price. But it has special applications, in which a little enhanced cost still leaves it very much more economical in use than other materials are. It has advantages, too, over coal-gas, in its superior purity, arising from the absence of all sulphuretted and ammoniacal compounds. The products of its combustion are simply carbonic acid and vapor of water, without any acid salts being formed at the moment, or afterwards.

As the basis gas, in the case of air-gas, burns with oxygen in mixture with it, the color of the light, and its action on colors which are changed by gas-light, were made points of observation. The conclusion reached was, that, like the flame of sperm or wax, the vapor deposited for the instant its ignited carbon less highly ignited than in simple coal-gas, as distinguished from cannel gas. The color of the light affected colors less than coal-gas does, and eyes sensitive to impressions from flame were able to bear this light with the same ease as accompanies the light arising from the combustion of sperm, wax, or oil.

In connection with the manufacture and extended use of air-gas, and its importance as a branch of industry, arises the grave question of abundant supply of the hydrocarbon material. I have been informed by those who have invested capital in the business, that arrangements have been made which enable them to obtain the quantity desired, and that the importance of abundant supply, at a low price, has been fully considered and acted on.

In its special application to lighting mansions and dwellings, where good illuminating gas is not supplied, and as a substitute for other materials used for lighting, air gas, as formed in the apparatus of Mr. Drake, can be used economically. And in the characters of ease of lighting, volume of dense flame, freedom from smoke, with perfect combustion, this gas resembles the best cannel gas, as we should infer from its composition.

The neatness of the mechanical devices, and evenness of motion in the machine, combined with the mode of obtaining an extended surface for saturating the air, render the apparatus complete, and they enable the inventor to bring before the public an interesting, as well as practical, mode of obtaining the luxury of lighting by good gas of domestic manufacture.

GREAT COAL OIL CASE.

Our English exchanges contain full reports of the important case of Young *vs.* Fernie, which involves the originality of James Young's patent for distilling paraffin, or kerosene oils from Boghead and other coals. A large amount of evidence has been taken on both sides of the case, and numbers of chemists and other experts have testified—some on the side of Young, and others on that of his opponent. What renders this case important, is that some of the most widely known chemists express the conviction that Young's invention was really novel, while others, equally eminent, declare it to have no novelty whatever, and that his process had been used many years before his patent was granted. The decision of the court in this case will be regarded with much interest, for business operations of great magnitude are involved in the result. The diversity of the scientific witnesses affords a commentary by no means pleasing, and suggests the unpleasant reflection that individual opinions frequently override what science teaches as fact,, and the followers of science often ignore the instructions which they should have thoroughly digested and appropriated, and descend to expressions of opinion outside their sphere.

Gas in Arizona.—The sudden rise of new towns in the mining regions of Arizona will soon necessitate the construction of gas-works. In California, gas-works were built, in increasing numbers, soon after the mining business became a settled thing, and also in Nevada. As a large influx of emigration is now settling in Arizona, new towns and villages must spring up with great rapidity, and the people will have the best artificial light. The same remark will also apply to Colorado, which is rapidly being settled.

Buffalo, N. Y.—We have been informed that opposition gas works are about being built in Buffalo. We must confess we cannot see the necessity of this.

Washington, D. C.—Congress is about chartering a new gas company for the city of Washington, for the supply of gas having a greater photometric value than that now in use, and at a maximum price of $3 50 per 1,000 feet. Guarantees of the most stringent character are required from the company of its ample ability to comply with these conditions before the charter will be valid, and the company are anxious to supply gas at that rate, under the belief that they can make handsome profits by so doing. The company are to lay down twenty-five miles of six-inch mains before the gas is sold, and for this they are to use the new bitumenized pipes, the patent for which, for this country, is owned by Thurlow Weed and another. This is said to be one of the most valuable patents in this country. The pipes are less than one-fifth the weight, and one-half the price of iron, to which they are superior in every particular, being indestructible from oxidising, and as strong as iron. If it is an object to sell gas in Washington at $2 50, with competition at that, could it not be afforded at less than $3 50 in other cities?—*Scientific American.*

[The result of the use of these bitumenized pipes will be looked for by gas engineers with some interest. At present there are many doubts as to their value.]

Petroleum Association of London.—The following resolutions have been passed by the committee appointed by the Association, and will be submitted for confirmation to a public meeting, to be held on Tuesday next, at the Baltic Sale-room, at twelve o'clock. A large attendance is expected:

"That petroleum be sold at per gallon weight. That draft of 4 lbs. per cask be allowed. That refined oil be sold at 8 lbs. per gallon, with 4 lbs. per cask draft. That crude oil be sold at per ton of 2,240 lbs., lubricating oils and greases to go with the crude, and spirits to be 7½ lbs. per gallon, with 4 lbs. per barrel draft. That taring be actual average tares ascertained by turning out ten for first 100 barrels, and four barrels for every other 100 barrels. That lowest point of ignition of refined oil be 100° Fahr. That in all forward contracts the average contents of each barrel be stipulated to contain not less than thirty gallons per barrel; on difference in price between contract price and price at prompt, be paid either by buyers or sellers (this not applicable to parcels afloat). That tenders of oil be made not later than three o'clock on all days but Saturdays, when they be made not later than twelve o'clock. That buyers be allowed three clear working-days to approve or reject oil after receipt of sampling order, but not more. That each party to a contract name his own arbitrator, and the arbitrators, in the event of not agreeing, an umpire; the losing party to pay fees; arbitrator to be named the day following rejection, if arbitration be claimed. That it be understood that petroleum oil sold for delivery, sellers are bound to tender the same four clear working-days before the expiration of period specified for delivery; and, in the event of their not doing so, buyers are at liberty to cancel the contract or buy against sellers. That gravity of good merchantable refined Pennsylvanian petroleum is not to exceed 812° at a temperature of 60° Fahr., and the gravity of good merchantable crude Pennsylvanian not to exceed 820°. That terms of quality be 'white' and 'good merchantable,' and that standards be procured, to be hereafter determined upon.—*London Grocer.*

Utilization of Gas in Coke Burning.—At the Selly Oak Nail Works, Birmingham, a new system of coke-burning has been adopted, whereby the offensive and pernicious gases which usually escape, to taint the atmosphere and injure vegetation, are turned to good account, according to the *Midland Herald*, by being conveyed to a neighboring furnace or fire, either for blasting, generation of steam, or other purposes where they can be usefully consumed. The new process consists in connecting a series of coke-heaps with flues leading into one main flue, communicating with the steam-boiler, the draught of which produces a beneficial effect; for, as the coal-heaps are lighted for burning into coke, the gas and sulphur thereby produced are drawn to the main flue, and from thence to the boiler, where they ignite and pass in streams of flame among the flues of the boiler, generating steam with very slight use of slack. There is a complete removal from the coal of all sulphurous properties, and thousands of tons of coal, now considered of no use, may thus be converted into strong and good coke. The invention is patented by Messrs. J. & C. Hawkins, of Walsall.

Gas Companies of the Metropolis and Suburbs.—New York and its suburbs are in a fair way of having an abundance of gas. In this city alone, we have the New York, Manhattan, Metropolitan, and Harlem Companies already in operation, and the "Hydrogenated Fuel Company," the "Anthracite," and the "People's" Companies in prospect. In Brooklyn, the Brooklyn, Citizens', and Williamsburgh Companies in are operation, while the Long Island and the "Peoples' Mutual Protective Gas-Light Association," are in contemplation. At Green Point, Hunter's Point, Astoria, East New York, Newtown, Jersey City, and Hoboken, there are gas works in operation, or about being built. Thus, within a radius of eight miles, there are no less than nineteen gas companies already chartered, the greater part of them now actively engaged in supplying gas to consumers, and with perhaps one or two exceptions, all of them doing well.

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

FRIDAY, APRIL 15, 1864.

We regret to learn that Professor JOHN C. CRESSON, who has for many years occupied the position of Chief Engineer to the Philadelphia Gas-works, has resigned his office, and the duty of electing a successor now devolves upon the trustees of that corporation. Up to the time of writing this, no selection has been made, although repeated efforts have been made to elect the various candidates proposed. Owing to the peculiar position of the Philadelphia Gas-works, being a municipal concern, few really competent engineers will care to have their names presented among the list of candidates. The tenure of office is exceedingly precarious, and is regulated entirely by political parties; and whichever party may for the time have a majority in the Board of Trustees, has the power of appointing or removing an engineer. Under these circumstances, there is very little encouragement for aspiring to the position. The next election may bring in a Board composed of men of a different political faith from the present Board; and, as the pestilential doctrine that "to the victors belong the spoils" is closely followed by the adherents of all parties, the probabilities are that we shall see many changes in the engineer's office. The fortunate candidate of this year may have to retire the next; and thus the whole administration of the works may from time to time experience a radical change.

The fact that Professor CRESSON held his office for so many years, even in the face of these frequent political changes, does not militate against our view of the uncertain tenure with which future engineers may expect to retain their positions. Mr. CRESSON has been identified with the Philadelphia works since their construction, and his personal worth and social position have done much to retain him in his office. Besides this, it is, comparatively speaking, within but a few years since the *personnel* of the Board of Trustees of the Philadelphia Gas-works has become so ephemeral in its nature. Before the consolidation of the city proper with the surrounding districts, which took place, we believe, in 1851, very few political changes occurred in the Board. The old Whig party was predominant in that city, which was called by its partisans the "Gibraltar of Whiggery;" and as rotation in office was not so favorite a doctrine with the Whigs as with their opponents, but few removals from office occurred during their sway.

It now remains to be seen how long an engineer may feel secure of his position in these municipal gas-works. Fitness for the office will have very little to do with the appointment or retention of candidates. Politicians will aspire to the position; and, as the hosts of these disinterested patriots are very persistent in their demands, and very greedy of the "plunder," which, they think, falls to their share, there will, doubtless, be a scramble for the office, anything but pleasant to behold.

Gas-works, such as those belonging to Philadelphia, should be controlled by an engineer of long experience, and acknowledged ability in his profession. It will not do to elect men because they may have shown administrative ability in other positions. The science of the practical management of gas-works is not to be learned in a day; nor can a novice be qualified as an expert, until he has spent months and years of laborious application and hard study. The knowledge required in the management of gas-works is eminently practical, and cannot be gleaned from books alone. Personal observation, and personal familiarity with all the details of every-day work, can alone fit an engineer for perfection in his calling. This fact will be patent to all thorough gas engineers, who are best qualified to be judges of the situation.

While we hope and trust that the successful candidate for the position of Chief Engineer in the Philadelphia Works may be fitted for the office by previous practical acquaintance with the duties of such a position, we fear that, in the heat of party strife, political qualifications will be regarded as of more importance. The engineership is by no means a sinecure. The district of the company is larger than that of any other company in the country. The works are very great in extent, and are situated at wide distances from each other. At this time they are overburdened, being taxed to their utmost capacity, in order to produce gas enough to supply the demands of consumers; so that an engineer, upon assuming the control of them, will have to put his shoulder to the wheel, and go to work in good earnest. As a matter of course, the results of his labors may not be immediately visible. Presuming that the proper person may be selected to fill the office, it would take months before he could get the machinery of a new administration in smooth running order; for, no matter how ably a previous *régime* may have been conducted, a new hand at the wheel will always have new notions of his own, which it takes time to perfect. As time revolves, new members of the Board of Trustees will be elected, as some of the old members retire. The new Board may happen to be of a different political faith from their predecessors, and, if so, most probably will be imbued with the spirit of rotation, which is a so frequent an occurrence in this country. In such an event, the engineer would, in all probability, be removed, and a new aspirant for the office elected. Such, then, is the encouragement held out to candidates for positions in municipal gas-works. We instance the Philadelphia Works because of the recent changes which have taken place, and because of their prominence in point of size, and the magnitude of their operations. Fortunately, there are but few of these political gas companies in the country, and the sooner they pass into private hands the better.

THE GAS TAX.—It is quite probable that Congress will increase the tax on gas, in which event several of our prominent companies will add the whole of it to the bills of their consumers.

CIRCULAR CLAY RETORTS.—Although double circular clay retorts have been tried and condemned by several of our most prominent gas-companies, they are with others coming into much favor. They are extensively used in Buffalo, N. Y., where, we are informed by Mr. Steele, they have given great satisfaction. The economy in fuel which these retorts accomplish is said to be very great, and they have many other advantages.

ANSWERS TO CORRESPONDENTS.

E. G., of N. Y.—*Your letter was not received in time, else we would have taken pleasure in attending to your request.*

J. G. H., of N. J.—*The subject of your letter, and the suggestion you make, have been in contemplation for some time, and we shall probably adopt them shortly. Prices have been advancing so rapidly recently, that to get up a reliable Price Current would require a considerable expenditure of time and labor.*

O. P. Q., of Mass.—*As you will see, by reference to another column, you have been rightly informed. We do not know how soon active operations will be commenced.*

G. F. M., of Md.—*We cannot inform you positively, but our impression is that the book is out of print. It is not very valuable, although some students pin their faith to it.*

S. D. N., of Ohio.—*It is very strange that you have not received the papers. They were sent as directed, and should have reached you long ago.*

A. B. E., of Ill.—*The present price of rosin is more than forty dollars per barrel, which places it entirely beyond the reach of gas-works, as a material for yielding gas. You will have to use petroleum, or, still better, petroleum tar.*

J. J. B., of Ky.—*The information contained in the article you quote was very incorrect. Fats, in their normal state, are not acids, but salts; that is, compounds of acids with bases. You will find the whole subject elucidated in Muspratt, Morfit, and Ure.*

THE CHICAGO LAKE TUNNEL.

On March 17th, the ceremony of formally breaking the ground for the Chicago Lake Tunnel took place at that city. This stupendous piece of engineering, which, in its bold conception, is worthy of the age in which we live, has been before now alluded to in our columns, and the official advertisement of the Board of Public Works of Chicago also appeared in the JOURNAL. The object of the tunnel is to secure for the city a supply of pure and wholesome water from Lake Michigan. The present supply of Chicago is drawn from the lake, but many complaints have been made of the quality of the water, which is contaminated by the discharges of the sewers of the city emptying, as they do, into the Chicago river, which flows into the lake. Into this river are discharged the contents of seventy-five miles of sewers, and this, with the refuse and slops from the numerous pork and beef-packing houses, distilleries and breweries, contaminates the waters of the lake, and has given rise to the numerous complaints which have been made.

Since the Chicago River, with its sluggish currents, has become the grand sewer of a great city, its influence upon the water of the lake has become more wide-spread and positive, and, as the increase in population and business of each year makes fresh demands upon its drainage capacities, this contamination of the lake water also rapidly increases. It has already reached a point where it can be endured no longer with either comfort or safety. The winds drift the contents of the sewers and the offal from the packing houses and distilleries, along the shore of the lake, to the very mouth of the "inlet-pipe" at the water-works, where, in a diluted form, it is pumped up and returned to the city through its hydrants, for use in the kitchens and parlors of its citizens.

This tunnel is to extend into the lake a distance of two miles, and it is believed that at this distance from the shore, the water will be entirely free from all impurities, and that through the tunnel it can be pumped in as pure a state as if brought from the centre of the lake.

The statistics of the construction of railroad tunnels in various parts of the world were examined, and many of them personally inspected, by E. S. Chesbrough, Esq, the city engineer of Chicago. The project of a tunnel under the lake was pronounced practicable, unless the soil were unfavorable. An examination of the soil underlying the lake proved it to be well adapted for the proposed work, and the ideas of the engineer soon began to assume a tangible shape.

From the Chicago *Times* we glean the following particulars respecting this great enterprise:

A number of parties competed for the contract, which was finally awarded to James Gowan and James J. Dull, gentlemen of large experience in the construction of public works. The contract was signed on October, 1, 1863, and provided for the completion

of the tunnel by November 1, 1865, for the sum of $915,139, exclusive of extra work arising from changes made by the Board in the mode of construction. It was intended to commence the work without delay, but the board determined upon a change in the shore-shaft, using iron cylinders for the first thirty feet; and the difficulty in procuring them, caused by the scarcity of labor at the foundries, the cold snap in January, and the strike among the engineers of the Pittsburg, Fort Wayne and Chicago Railroad, by which their shipment was delayed, deferred the commencement of the work until yesterday.

The work upon the shore-shaft was commenced on the 17th March, with imposing ceremonies. It marks the shore-end of the tunnel, which will be at the present water-works of the city, corner of Chicago avenue and Pine street, in the North Division. The first thirty feet will be inclosed in iron cylinders two and a half inches thick, firmly bolted together. These cylinders are three in number, one resting upon the other. Each cylinder is ten feet long, nine feet in diameter, and weighs almost thirty thousand pounds, or, in the aggregate, the three cylinders will weigh almost ninety thousand pounds. As the earth is thrown out, the cylinder will, of course, settle down. When level with the surface of the ground, another section will be placed upon the top of it, the two firmly bolted together, and the work of excavation proceeded with. The third will be attached in its turn, and the work pushed forward until the depth of thirty feet is reached. This, it is believed, will take the workmen through the soil and quicksands, and some feet into the firm clay formation, when they will be safe from the irruption of water.

From the bottom of this shaft the tunnel proper commences. It will be constructed at right angles from the shore, and, when completed, the outer end will be two miles from the land-shaft. It will be almost circular in form, being five feet two inches high and five feet wide, the variation from a true circle being made on account of the keystone to the arch. It will be laid with brick masonry eight inches thick. The brick will be laid lengthwise of the tunnel, in two shells or rings, with "toothing-joints." Including the shore-shaft, there will be nearly 5,000 cubic yards of masonry, requiring, in round numbers, about 4,000,000 bricks. The actual excavation of the tunnel, in order to give it a diameter of five feet inside the masonry, will be about seven feet, requiring the removal of about 16,000 cubic yards of earth.

In order to facilitate the completion of the tunnel, one or more shafts, inclosed in cribs, will be sunk in the lake, to a level with the bottom of the tunnel, and a section in the great work will be completed from each. The outer of these cribs, in which will be placed the "inlet gates," will be a permanent structure, and, by a recent Act of Congress, will be surmounted by a lighthouse. The crib will be constructed upon the north pier, where it can be launched in deep water. It will be forty feet high, and have five sides, each one of which will be fifty-eight feet long, making it about ninety feet in any direction across the top of the crib. It will contain fifteen separate water-tight compartments. In the centre of the crib will be a well, open at the bottom, and twenty-five feet diameter. Each angle of the structure will be protected from ice, or any other body borne upon the waves, by an iron armor two and a half inches thick, and covering two feet each way from the angle, and twelve feet up and down.

When the crib has been completed and launched, it will be towed to its place opposite the present water-works, and two miles from the shore-shaft. Here it will be securely moored by immense cables, reaching in every direction to "mooring screws," forced ten feet into the clay at the bottom of the lake. Each of the fifteen water tight compartments of the immense crib will then be filled with clean rubble-stone. This will sink the crib until the bottom will rest upon the bed of the lake. The water here is thirty-five feet deep, and the top of the crib will therefore be five feet above the ordinary surface of the lake.

Some idea of the magnitude of the work may be inferred from the immense amount of material required in the construction of the crib, and its great cost, which, it is estimated, will reach $75,000. There will be used, when reduced to board measure, 615,625 feet of timber, as follows:

38,368 feet white pine timber,
42,000 feet white oak timber,
20,000 feet two-inch white pine plank,
18,000 feet two-inch white oak plank.

There will be, besides, 6,025 cubic yards of stone, worth at least three dollars per cubic yard; 400 bales of oakum, and in the neighborhood of sixty-five tons of iron bolts, used in the construction of the outer crib.

After the crib has been firmly placed in position, with the compartments filled, and everything else in readiness, the work of sinking the outer cylinder will be commenced. Its position will be in the well, in the centre of the crib, of which mention has already been made. This cylinder will be sixty-four feet in length, of the aggregate weight of 203,000 pounds. It will be divided into seven sections.

The bottom section will be suspended in the well first, and the next one placed upon and firmly bolted to it, the joint being made water and air-tight by means of putty and red lead. The two will be lowered, and another section placed upon the top, and so on until all are firmly bolted together, and the bottom one resting upon the bed of the lake. The cylinder being in position, and the water pumped out, the top is closed, and made, as near as possible, air-tight. A powerful air-pump, driven by the steam engine, is then set at work, and speedily withdraws all the air from the cylinder. The atmosphere then presses it down with tremendous power. After the vacuum is complete, each stroke of the pump draws down the top of the cylinder with a force equal to the expansive power of the steam in the boiler, less the amount expended in running the engine, and sucks up the earth from the bottom. The power on the inside drawing down, and the power on the outside, in the shape of the atmosphere, pushing down, are sufficient to force the massive cylinder through the hardest of clays. After it has been forced down several feet, the top of the cylinder will be removed, and workmen sent in to remove the earth drawn up into the cylinder by the powerful suction of the exhausting pump. When this is complete, the top will be closed, and the cylinder driven several feet further into the clay, when it will be again opened, and earth drawn out, and so on until the bottom of the cylinder has reached the necessary depth. This operation is the only one by which the cylinder could be sunk.

When the cylinder has been driven down through the clay to its proper position, the workmen will also commence from that end the construction of the tunnel. The bottom of the east end of the tunnel will be sixty-six feet below the ordinary level of the lake, and the bottom surface will descend uniformly to the west end at the rate of two feet per mile. The object of this slope is that, when the tunnel needs repairs, and the "inlet gates" are closed, the water can be entirely pumped out at the west end. From the foot of each shaft a narrow railroad track will be laid and extended as the work progresses upon the tunnel. Cars capable of carrying a cubic yard and a half of earth will bring to the shaft the earth from the end of the tunnel, when the car, with its contents, will be hoisted out by a windlass connected with a steam-engine. There will be two mules in each section of the tunnel, each one of which will draw trains of two cars to the foot of the shaft. A chamber will be made part way, where they can pass each other, and a turn-table, to enable one of the trains to enter the chamber. Five men will be employed at the end of the tunnel. Two of these will be regular miners, and three of them ordinary laborers. One of the miners will go ahead and run a regular drift in the centre of the tunnel, being an excavation about two and a half feet wide, and not of a greater perpendicular than the tunnel. One of the laborers will follow after this miner, and break down the sides of the drift, until near the shape and size of the tunnel. The other miner follows, and trims up the work to the proper shape and size. The other two laborers load the cars, and, when not thus engaged, will assist in "breaking down" from the corners of the drift, or in trimming up, as may be necessary.

Each car going to the shaft with a load of earth will bring back a load of brick and cement, and the masons will follow only a few feet behind the miners. The masonry will be constructed in sections of not more than two feet. It will be, as before mentioned, eight inches thick, laid in two rings. The only connection between the two will be half an inch of hydraulic cement. As soon as a section is completed, the space between the masonry will be filled with dry clay, and rammed until as firm as the original earth. The frame-work supporting the top will then be removed, and another section commenced.

An ingenious mode of ventilation has been adopted, which will secure to the miners a steady current of fresh air, and carry off all foul vapors. A furnace will be put up at the lower end of the shaft, the chimney of which will reach far enough above the upper end to secure a proper draught, and to prevent the smoke from being carried back into the tunnel. This furnace is supplied with air by a pipe, the end of which is carried forward under the track with the miners, as their work progesses.

There will be three openings or flumes through the crib into the well in the centre. Each one of these openings will be five by four feet, guarded by double iron gratings, and capable of being closed by wicker gates, operated by iron rods reaching to the surface. One of these openings will be five feet from the bottom of the lake, another one ten feet, and the third one fifteen feet. Each one will be on a different side. In case a hard storm should disturb the waters of the lake at the bottom, the lower inlet could be closed, and, if the wind should drive impure water from any direction along the surface, the upper one could be closed. This arrangement, it is hoped, will afford the purest of water at all seasons, despite the storms, and regardless of the direction of the wind, which now drifts to the "inlet-pipe" the contents of the Chicago river one day, and the next the milky fluid from the clay-beds up the lake.

The water passes from the well in the centre of the crib into the cylinder, through an opening five by two and a half feet, which can be closed by a vertical or sliding gate.

The contract price is $315,139, with an allowance of $850 for each foot (in excess of five) the cribs are raised above the surface of the lake, and a provision that, in all changes in construction, required by the Board of Public Works, the contractors shall receive suitable pay. Labor has increased at least fifty per cent. since the estimates were made, and material almost, if not quite, one hundred per cent.; and it is scarcely possible that the work can be accomplished for anything like the sum specified in the contract.

About ten o'clock on the morning of March 17th, those gentlemen who were to take part in the ceremony of breaking the ground began to make their appearance, and were heartily welcomed by Mr. Gowan, of the firm of Dull & Gowan, contractors. Mayor Sherman delivered an address, in which he gave an account of the difficulties encountered in the selection of a site for the work, and the prospects of its successful completion. The Mayor then entered the small wooden shed adjoining the office of the contractors, and as many of the company followed as could find standing-room, to witness the ceremony of breaking the ground. A pick was placed in the mayor's hands by Mr. Gowan, one of the contractors. His Honor pulled off his coat, and applied the pick to the solid, frozen earth in a workmanlike manner, while jokes were bandied on all sides relative to the mayor's powers as a laborer. But his Honor, in this, as in all other matters, kept steadily at work, dealing ponderous blows, and soon the ground was loosened several feet around. Mr. Letz and Mr. O. J. Rose then advanced, with spades in their hands, and each quickly threw a spadeful of earth into a barrow, which Mr. Gowan was standing prepared to wheel off. But, before doing so, Mr. Chesbrough was invited to throw in a spadeful, which he did. The aldermen present crowded in, headed by Alderman Brown, who plied the spade with great alacrity, and then handed it to Alderman Holden, and it was passed along to the aldermen present, each of whom helped to fill the barrow with earth, amid the greatest merriment. At last the barrow could hold no more, and, with a round of applause, Mr. Gowan, the junior contractor for the

work, trundled it out. Two jars were then filled with the earth, one of which will be sent to the Historical Society, while the other will occupy a prominent place in the office of the Board of Public Works, and the ceremony terminated.

REPORTS OF GAS COMPANIES.

CRYSTAL PALACE DISTRICT GAS COMPANY, LOWER SYDENHAM, KENT, ENGLAND.

Directors' Report.

Directors' Report for the half-year ending the 31st of December, 1863. To be presented to the shareholders, at the ordinary general meeting, on the 24th of March, 1864.

The directors report the satisfactory progress of the company's operations during the half-year.

The works and plant are in good order and effective, and commensurate with the present wants of the district.

To provide for the further increase of the district, the directors have purchased additional land, adjoining the company's present ground; and have entered into contracts for the erection of a new gas-holder, capable of containing 400,000 cubic feet of gas.

In the directors' report for the half year ending December, 1862, the shareholders were informed of a prospective reduction in the price of gas throughout the district. This reduction commenced on the 1st of January, 1863; and in the autumn of the same year, it was determined to make a further reduction in price, to commence on the 1st of January, 1864. These reductions have been carried into effect.

In consequence of the reduction in the price of the gas, and the recent low price of coke, the profits on the half year are relatively less favorable than in the corresponding half of the preceding year.

Application having been made to Parliament to introduce a bill for the creation of a new company, intended to light the district occupied by the Crystal Palace District Gas Company, your directors have taken the proper steps for opposing such application.

The directors going out of office by rotation, are Mr. Erasmus Wilson and Mr. Henry Palfrey Stephenson; and these gentlemen, being eligible, offer themselves to the shareholders for re-election.

The auditor going out of office by rotation is Mr. George Garraway; and this gentleman, being eligible, offers himself to the shareholders for re-election.

The balance sheet for the half-year, to the 31st of December last, and appended to this report, shows the financial position of the company. The profits for the half-year are £3,630 : 5 : 10, which, together with £245 : 2 : 4, the unappropriated profit of the preceding half-year, makes the available balance £3,875 : 8 : 2. Out of this sum the directors recommend the declaration of a dividend at the rate of six per cent. per annum on the preference capital; and a dividend at the rate of ten per cent. per annum on the ordinary capital of the company, both free of income tax; the balance of £216 : 6 : 8, to be carried forward to the profit of the succeeding half-year.

(By order of the Board,)

ERASMUS WILSON,
Chairman.

February 26th, 1864.

PROFIT AND LOSS, HALF-YEAR ENDING 31ST DECEMBER 1863.

Dr.	£.	s.	d.
To amount for coals carbonized	4,541	12	8
" lime, and oxide	162	18	2
" trade charges	578	5	9
" rent, rates, and taxes	536	5	9
" directors' and auditors' fees	530	0	0
" salaries and collector's commission	541	5	6
" wages	1,639	19	0
" interest on loans	170	15	9
" bad debts and allowances on collection	48	3	8
" reserve fund	1,000	0	0
" retort account	271	7	10
" parliamentary expenses	250	0	0
	£10,270	14	1
" balance	3,630	5	10
	£13,900	19	11

Cr.	£.	s.	d.
By gas rental £11,127 0 7			
" meter rental 215 17 10			
	11,342	18	5
" coke made for sale	2,168	7	5
" breeze ditto	98	1	6
" tar ditto	171	2	6
" sundries	15	15	7
" sulphate of ammonia, net profit	104	14	6
	£13,900	19	11

BALANCE SHEET, 31ST DECEMBER, 1863.

Dr.	£.	s.	d.
To Proprietors for paid-up capital:			
" 5000 shares, at £10 per share	50,000	0	0
" 5000 preference shares, at £10 per share £50,000			
" less amount uncalled 8,145			
	41,855	0	0
" loans	7,050	0	0
" amound due to sundry persons	8,780	0	11
" reserve fund	4,200	0	0
" interest on investment to 31st Dec., 1863 £84 18 2			
" appropriated from profit and loss as above £1,000 0 0			
	1,084	18	2
" profit unappropriated, 30th June, 1863	245	2	4
" profit and loss	3,630	5	10
	£116,845	7	3

Cr.	£.	s.	d.
By amount for plant, &c.	83,253	13	7
" freehold land	8,901	8	1
" preliminary expenses	3,384	13	1
" parliamentary expenses	250	0	0
" retort account	768	18	1
" stock on hand	4,171	11	8
" amount due from sundry persons	760	17	8
" amount invested	*4,200	0	0
" private rental and arrears	7,963	17	5
" public rental and fitting arrears	2,961	11	9
" balance at bankers	228	15	11
	£116,845	7	3

Examined and found correct,

JOHN GRAY,
GEORGE GARRAWAY,
Auditors.

29th February, 1864.

APPROPRIATION OF BALANCE.

	£.	s.	d.
Balance brought forward from last account.	245	2	4
Balance of profit and loss, 31st Dec. 1863	3,630	5	10
	£3,875	8	2

	£	s.	d.
Dividend on preference share capital, at 6 per cent.	1,159	1	6
Dividend on ordinary share capital, at 10 per cent.	2,500	0	0
	£3,659	1	6
Balance to be carried to next account	216	6	8
	£3,875	8	2

(By order of the Board.)

ERASMUS WILSON,
Chairman.

*The reserve fund of £4,200 has been invested as follows:

£2,051 17 10	in the purchase of £2,000 4 per cent. India bonds.
1,062 10 0	in the purchase of £1,000 Victoria 6 per cent. Government bonds.
1,085 12 2	in the purchase of £1,164 1 0 Consols.
£4,200 0 0	

† To be invested after the meeting.

ANNUAL STATEMENT OF THE NEW DUNDAS GAS LIGHT COMPANY, OF CANADA WEST, for the year ending 31st December, 1863:

Declared capital stock	$25,000	Paid up shares	$21,300
Subscribed capital	21,300	Unpaid "	3,700

Amount of assets of Company, 1st January, 1864	$20,000 00
" liabilities	5,526 09
Credit balance	$14,473 91

The above statement has been duly attested by me, on oath, and registered according to law.

A. R. WARDELL,
Secretary.

Dundas, 19th January, 1864.

We, the undersigned, President and Directors of the New Dundas Gas Light Company, believe the above statement of the affairs of the said Company to be a true and correct one, to 1st January, A. D., 1864.

JAMES COLEMAN,
President.

JAMES E. THOMSON,
THOS. H. MCKENZIE,
JOHN GARTSHORE,
JAMES COLEMAN,
J. B. GRAFTON,
JOHN DICKIE,
Directors.

Dundas, 19th January, 1864.

At the annual meeting of stockholders of the New Dundas Gas-Light Company, held pursuant to public notice, on the 19th instant, the following gentlemen were duly elected directors for the present year:

JAS. COLEMAN,
THOS. H. MCKENZIE,
HUGH MOORE,
J. B. GRAFTON,
JOHN GARTSHORE,
JAMES CROSSLAND,
JOHN DICKIE,
JAMES E. THOMSON,
A. R. WARDELL,

Thomas H. McKenzie was afterwards elected President of the Company.

A. R. WARDELL,
Secretary.

Dundas, 19th January, 1864.

FATAL ACCIDENT IN A GAS-WORKS.—On March 3d, a fatal accident occurred at the gas-works of Bankside, England, by which one Dennis Murphy was killed. Murphy was employed at the works to clear the retorts of coke, after the charges of coal had been worked off. On the above day, the deceased was drawing a charge, when he fell into a hole some twelve feet deep, amongst the red hot coke he had drawn. He was horribly burned, and shortly after died. The opening in the floor through which the unfortunate man fell, was 2 feet 9 inches wide, and was used for allowing the hot coke to fall through. In reply to a question, whether this opening could not be protected by a railing, it was stated that this would interfere with the working of a truck.

GAS IN ENGLAND.—The price of gas in Gloucester has been reduced from 5s. to 4s. 6d. per 1,000 cubic feet.....The Redhill Gas Company's directors have determined still further to reduce the price of their gas from 7s. to 6s., having earned a dividend of 6 per cent., free of income-tax, by their last reduction, besides carrying a considerable balance to their reserve fund.....The Newport Gas Company have declared a dividend of 10 per cent. per annum on Class A shares, and 7½ on Class B shares.....The Stafford Gas Company have declared a dividend of 7½ per annum.....The Andover Gas Company have reduced their price 1s. per 1,000 feet, or 10 per cent. on previous prices.....The Liverpool United Gas Company have declared their usual dividend of 10 per cent. per annum for the last half-year.....The Winchester Gas Company have reduced their price from 6s. to 5s.....The Ipswich Gas-light Company have made a further reduction in price from 4s. 6d. to 4s. The demand for their gas is so much on the increase that they require new capital to carry out requisite works. The company have just declared a dividend of 10 per cent., free of income-tax, besides "arrears of dividends."

THE SHEFFIELD RESERVOIR FAILURE.

The frightful calamity that has fallen on Sheffield is already known to all our readers. The large embankment which has failed, held up the Bradfield Reservoir,—a work of considerable magnitude, recently completed to afford an additional supply of water to Sheffield, which has long needed the additional quantity this reservoir was intended to afford. The position of the reservoir is about eight miles to the northwest of Sheffield, and its elevated situation, and large and excellent gathering ground, are admirably adapted for the supply of an important town; it is almost at the head of the Loxley river. The river, at this point, is shut in between high banks on each side, affording facilities for throwing an embankment across, and thus forming a good natural reservoir in the bed of the river. Another reservoir is being formed on the Agdon Brook, to the northwest of Lower Bradfield, and scarcely a mile from the Bradfield Reservoir. The embankment for this reservoir is, it seems, being formed of like materials and in a similar manner to the Bradfield Reservoir. This county (Yorkshire) appears to enjoy an unenviable notoriety with regard to the failure of such works. It will be in the remembrance of our readers, that the embankment of the Bilberry Reservoir, Holmfirth, failed in a similar manner, in February, 1852,* by which means 100 souls were launched suddenly into eternity "with all their imperfections on their heads." In the present instance, to the latest date, 258 are missing, and 244 are reported found by the police; so probably the deficiency will soon be made up; one body was found down as low as Doncaster.

We need not dwell long on the vast amount of property this untoward accident has destroyed, as that is being fully detailed in the daily press; suffice it to say, that the mighty torrent of pent-up water let loose has cleared away everything that impeded its course,—bridges, mills, cottages, and mill-dams: some of the former were substantially built, particularly Hillsborough Bridge, one arch of which is now standing, but the parapet walls are swept away. With regard to the latter, the sweeping away of dams, in the headlong torrent of the flood, added to the accumulation of the water as it proceeded; which swelling and augmenting in volume, committed such serious depredations between Malin's and Hillsborough Bridges, and lower down on the banks of the Don, and in the streets of Sheffield. Many of the cottages that are carried away were built of the grit stone of the district, and in a manner peculiar to the masons of the locality, with wrought stones at the face and back of the wall, the middle being filled up with rubble, with scarcely any bond stone through the walls, and probably with many of the stones placed on their edges, instead of on their beds. The brick-built cottages appear to have stood very well, and to have resisted the terrible battery of the troubled waters. In one instance we saw the remains of a cottage that had been built of stone, at the west end of the row: the front and part of the end walls were swept away, while the chimney-breast and chimney built of brick remained nearly perfect. We have reason to hope that the extent of the damage done is somewhat exaggerated, both by the local and London press. In a calamity of this extent it is difficult at first view to fairly estimate the amount, or for the human mind to grasp results by the *debris* scattered around them. Suffice it to know, it is probable we shall soon be made aware of the extent of it, as we find that the company is responsible, by their last Act, for all damage occasioned by the failure of embankments, the clause being properly put in soon after the failure of the Holmfirth reservoir. A meeting has been already held by the owners of the property destroyed, and they are stirring themselves with the view of making a combined application to the company for redress and compensation.

The Sheffield Waterworks Company has hitherto been considered as a good security for investment. Their capital is said to be a little over £400,000, and their £100 shares are worth £145 in the market, but the damages by the flood have been estimated at £500,000. This sad affair will prove very disastrous and ruinous to the company. From Hillsborough, down the vale of the Don considerable damage has been done; several bridges are swept away—particularly some of iron, which readily yielded to the pressure and buoyancy of the water, while Lady-bridge and other brdges built of stone maintained theirground, and proved their superiority to withstand sudden irruptions of water arising from heavy rainfall or floods from large gathering grounds in hilly regions. In the Wicker we observed the occupiers of the houses and shops busily engaged in pumping out and emptying their cellars of the water and *debris* brought down by the flood. In this locality it is said the water was some five or six feet deep, the water being diverted in its course from the Don at Lady-bridge, the arches of which were obstructed by timber; &c., brought down. If the cellars had been connected with the sewers, the water would have quickly passed away as the flood subsided.

Walking over the scene of the calamity, and up the course of the Loxley brook or river to the reservoir, every striking object was observable. The course of the river was originally narrow, winding, and tortuous, studded here and there with mills, and with rows of cottages near its banks at the lower end, and as you arrived near the reservoir houses were much less numerous.

At the lower end it now appears like the bed of a capacious river suddenly run dry, and the upper parts are shut in between high and precipitous banks; the whole course of the river is beautiful and picturesque, but the charms of the natural scenery of this romantic valley are now marred by the refuse and wreck of the mills of the indefatigable manufacturers, and the humble homes of their stalwart and industrious artisans.

Arriving within about three miles of the dam-head, may be seen, looming in the distance, a dark-looking object, like a small mountain, with a chasm in its midst, stretching across the valley, and reminding one of the disruption of the fair face of the mother earth, in tropical regions, by mighty earthquakes, or the rugged gorges of mountain torrents, whose courses are frequently changed, to afford vent for heavy rain-falls or melting of snow. After a careful inspection of the chasm in the bank, we went up the by-wash to the waste-weir. This is 12 feet wide, with side walls three feet high. The bottom is curvilinear, the centre being about six inches lower than the sides. It is connected with the reservoir at the south end of the embankment and the southeast corner of the reservoir. It is about one foot below top water of the reservoir. The by-wash just below its junction has several steps of about three feet each, and toward the mouth there is a circular curb some four feet high: this was the part they tried to blow up with gunpowder when they found the bank failing, so as to lower the head of the water and necessarily the hydraulic pressure. There are two drill-holes now visible in this curb. This by-wash is well constructed of solid grit masonry; but the end next the river is many feet above the bed of the stream, the bed, I suppose, having been cut deeper by the scour of the water that escaped from the reservoir. Below the waste-weir, the bank and pitching together had sunk considerably, showing a defect and settlement there. It occurs to us that at this point something was wanting. Sluices would have been useful that could have been easily drawn, so as to have lowered the level of the water in the reservoir, if it had accumulated too rapidly after heavy rain-fall over so large a gathering-ground, or from the sudden melting of deep snow.

The reservoir is about 78 acres in extent, and is said to contain 114,000,000 cubic feet of water. The embankment across the valley at the east end of the reservoir is about 400 yards long, and its altitude in the deepest part about 90 feet. The embankment is said to contain 400,000 cube yards of earth. The width of the embankment at top is 12 feet, with inner slope apparently of 25°, presumably intended to be two to one, and outer slope 30°, presumed to be intended for 1¼ to one. The face of the slope of the embankment from the surface of the water that remains in the reservoir appears to be solid earth for about 40 feet, rough rubble stone loosely placed on about 56 feet, and the top part about 76 feet, pitched by hand, and from about one foot to one foot to six inches thick. These dimensions are taken of the inner side of the embankment from the base to the apex. There does not appear to be any puddle-lining underneath the pitching, on the face of the inner side of the embankment.

As to the embankment itself, the chasm is not quite in the centre, and is about 300 feet long at the top, gradually narrowing and tapering down. The bank has also sunk from its long sectional level on each side of the chasm some 150 feet or more, probably from the effects of the bursting away of the middle part of the embankment, or from the settlement (sinking) of the loose material of which the upper part of the embankment seems to be composed. There is a puddle-wall in the centre of the embankment, said to be 17 feet at base, and tapering gradually up to five or six feet thick at top. The material of which it is composed appears to be a darkish or bluish-colored clay, but its exact quality could not be fully scrutinized, and it appeared mixed up and discolored by the falling earth.

The appearance of the puddle is not very satisfactory. Near the centre and at the base of the embankment, are fixed two 18-inch iron discharge or supply pipes, surrounded on three sides by walls of masonry; but we did not observe any apparatus for opening or closing the valves,—indeed, nothing but the masonry: perhaps the apparatus was washed away by the overwhelming and irresistible torrent. Looking at this embankment in suction, the lower part or base of the embankment for about twenty or thirty feet appeared to be composed of good solid earth, as far as could be seen; but above that, the material of which it is composed looks loose and friable, with large quantities of loose stones in it; in fact, if you look at the course of the river some distance below the dam-head, it is covered with loose stones of a similar character to those that appear now in the embankment. Indeed, they appear to be forming the Ogden embankment in a similar way. It seems to us almost impossible to form a solid embankment with such materials, particularly a dam head to a reservoir. If such material were used to form a railway embankment of that depth (90 feet), it would take some four or five years or more to become consolidated, the bank would continue to sink after heavy rains and from the weight of the passing traffic, and would require constant care to raise it, and reinstate it to its original level. Indeed, we are disposed to attribute the accident to the water filtering into the loose and porous embankment, which caused the disrupture of the puddle-wall, as the first crack was seen in the centre of the embankment, and about twelve feet down its outward side, occasioned, probably, by the settlement and consolidation of loose earth when the water got in contact with it. The bank dropping in the centre would soon afford a passage for the accumulated water at the top, which gradually washing and breaking it away, would ultimately occasion this frightful chasm, and release the angry water, scattering death and destruction down the ill-fated valley.

Again, the embankment was formed by means of tramroads and wagons, instead of the old fashioned and more effective three-wheeled carts; it was not raised in regular lifts or layers, say two or three feet in thickness, so that the earth might become thoroughly consolidated as the bank rose, and this consolidation would have been hastened and perfected by passing over it the weight of the material of which it is composed. As the race of our old and practical coal-engineers are dying off, we may hear more of these lamentable accidents; the modern school of engineers devote themselves more to railway and other similar works, and large hydraulic works are now few.

We have now two of Telford's plans for reservoirs lying before us, the one (Rotten Park) a 50-feet bank, top bank 20 feet, puddle 15 feet at base and six feet at top, inner slope three to one, outer two to one; another (Hurleston), height of embankment 40 feet, top of bank 10 feet, puddle at base 10 feet, top four feet, inner slope three to one, outer two to one; and could instance many others; but these are successful works, and have been in operation many years. "Look on this picture and on this." The great defect of the work that has failed seems to be the loose and porous embankment, the top is too narrow for an altitude of 90 feet, the puddle-wall too thin; but that perhaps would not have been of so much consequence if the bank had been of good solid materials. There is no puddle-lining to the inner sides of the embankment; no proper sluices with wastes to lower the water below the waste weir if rendered necessary, or to assist the weir; and no discharge-pipe to empty the reservoir at any period if

* See *Builder*, vol. x., pp. 107, 119, 151.

required. The slopes are too steep, they should not have been less than three to one inside, and two to one out.

These observations are necessarily hastily made: we may look into the questions involved more carefully on another occasion.

The subscriptions for the sufferers already amount to £17,000.—*London Builder.*

ASPHALTUM IN CALIFORNIA.—The Mariposa *Free Press* says:—"An extensive deposit of asphaltum, and numerous springs furnishing the substance, have been discovered by Stephen Bond, of Bear Valley, near Beuna Vista Lake. The locality was first found in June last, by Mr. Bond, while on a prospecting tour. It is situated about 18 miles from the lake, on the San Lois Obispo trail, and the bituminous region, so far as explored, is some eight miles in extent. As it boils up on the surface, its temperature is warm, and it is of about the consistency of molasses, but cools and hardens by exposure to the air. Rats, mice and birds become entangled on its surface while it is in a semi-liquid state, and, being unable to extricate themselves, perish. Hundreds of them, in all stages of decomposition, are found on the asphaltum beds. Mr. Bond brought some specimens of the substance with him, and by experiment it is found to be of a superior quality for the manufacture of coal oil or kerosene, which is prepared by a process of distillation. Its locality—so far from easy means of transportation—renders its value doubtful."

WATER SUPPLY OF PARIS.—The Municipal Council have decided that two more artesian wells shall be bored in Paris—one at the Buttes aux Cailles, in the 13th arrondissement, on the left bank of the Seine, and the other at La Chapelle, in the 18th. The boring of these wells is to be continued with the greatest activity, in order that the new public garden about to be opened at the Butte aux Cailles may be well supplied with water. The new water machines erected at the Quai d'Austerlitz raise 22,000 cubic meters of Seine water every 24 hours. The Municipal Council are unceasing in pressing forward the works for conveying the waters of the river Dhuis to Paris. Eight miles of the aqueduct and three of the pipes are completed. It is the greatest work of the kind that has ever been undertaken in Paris. The reservoir will contain 100,000 cubic yards of water from the river Dhuis, in its upper part, at 520ft. above the level of the sea, and 30,000 cubic yards of water from the river Marne, in its lower part. Another reservoir, two stories high, is being constructed for the service of the high quarters of Paris, near Belville. The upper story will receive 15,000 cubic yards of water from the river Dhuis, by means of a machine, at a height of 450 feet above the level of the sea. The lower story will receive 25,000 cubic yards of water from the river Marne.

MICHIGAN PETROLEUM.—The indications of oil here, and hereabouts, receive each day new confirmations. Since our last issue, at least a dozen new leads have been discovered, the most important of which is located three miles from this village, west by north, on land owned by Mr. David See, a merchant of this place. The Paw Paw river runs through the doctor's land, and is bordered by a tamarack swamp, near the centre of which is high ground. On this elevation a spring boils up and discharges oil in small quantities, but of a stronger and purer nature than that from other localities where samples that we have seen were procured. One peculiarity of this oil is, that when first dipped up it has no perceptible smell; but, on being confined in a bottle, and slightly warmed and shaken up, it has a strong and unmistakable kerosene odor. Where indications of oil are so many and favorable, it will, indeed, be surprising if the subject be allowed to rest without a thorough search for the main fountain.—*Paw Paw Press.*

GAS IN ENGLAND.—Some of the inhabitants of Lyndhurst are anxious to have gas, and several hundred shares have been promised to be subscribed for. It is thought that with a capital of about £3,000 or £4,000, in shares in £2 shares (limited liability) the works would pay from five to seven per cent.

PATENTS.

41,764.—James K. Fairbank, Waupun, Wis., for a Pump:

I claim a pump having an interior cylinder adjusted, in the manner set forth, and also the bands, B B, and bolts, f f, arranged to strengthen the upper part of the stock, and afford bearings for the handle, all as shown and described.

41,774.—E. Hobbis, Newark, N. J., and Alex. McNair, Bloomfield, N. J., for a Lamp Burner:

I claim a tube placed at or attached to the exterior of the lamp-burner, in connection with a horizontal rotating or slide-stopper, or cover, applied to the tube, all arranged substantially in the manner and for the purpose herein set forth.

41,792.—William Starkey, Brideport, N. J., for a Lamp Chimney:

We claim, in combination with a furnace, A, and its chimney or smoke discharge flue, P, a system or series of air and gas regenerators, B1, B2, B3, B4, constructed substantially as specified, and having conduits and dampers arranged, so that air and gas may be led into and through such regenerators and furnace, and out of the chimney, in manner, and so as to be operated as and for the purpose or purposes hereinbefore described.

We also claim the arrangement and combination of the air space, or open chamber, C, with the furnace and its system of regenerators, arranged and applied together, substantially in manner, and so as to operate as described.

We also claim the arrangement and combination of the air-chamber, or space, D, or the same and the space, E, with the furnace, regenerators, conduits, and damper-chests applied thereto, the whole being substantially as specified.

41,788.—Charles Wm. & Frederick Siemens, London, Great Britain, Regenerator Furnace:

I claim the metal cap composed of the outer casing, C, and inner casing, D, adapted to each other, and arranged in respect to the glass portion, A, of the chimney, substantially as and for the purpose herein set forth.

41,794.—Albert Taplin, Providence, R. I., for a Lamp:

I claim the construction of the connections substantially as herein set forth, and for the purpose specified.

41,795.—Albert Taplin, Providence, R. I., for a Lamp Collar:

I claim the combination of the upper and lower parts of the collar with the clasp-joint and spring, D, when constructed and operating substantially as described, and for the purpose set forth.

41,796.—T. J. Townsend, Baltimore, Md., for a Lamp Chimney:

I claim the employment or use in a lamp-chimney of a metal top, B, so constructed and arranged as to admit of expanding and contracting circumferentially, for the purpose of being readily fitted to and detatched from the glass portion, A, of the chimney, substantially as set forth.

41,799.—George I. Washburn, Worcester, Mass., for an Apparatus for Pumping and Condensing:

I claim, First, The oscillating chambered shaft, A 1 2 3 4, arms, D1 D2, balls, E1 E2, and ports, W1 W2 W3 S S1 S2, constructed, arranged, and operating, substantially as and for the purposes set forth.

Second, In combination with the above-described oscillating chamber-shaft, I claim the elevated condensing-tank, I, water-pipe, J, and steam-pipe, H, operating in the manner described, to condense steam by contact either with the water in the tank, I, or with the part of the pipe, H, immersed therein.

Third, The combination of the steam-pipe, G G1 G2, oscillating chambered-shaft, A 1 2 3 4, and discharge passages W' K, substantially as and for the purposes set forth.

Fourth, In an apparatus constructed and operating substantially as hereinbefore described, I claim the employment of the current of water forced through the pipe, K, to communicate motion to machinery in any manner, substantially as described.

41,816.—Jerome B. Howe (assignor to himself and Josiah C. Richards), Middleville, Mich., for a Current Water-wheel:

I claim, in the construction of a submerged vertical shaft current water-wheel, the combination of the hinged buckets, d d, and braces, e e, arranged and operating substantially as and for the purposes herein specified.

41,821.—D. S. Stevens (assignor to himself and Charles Seymour), La Porte, Ind., for a Water-wheel:

I claim, First, The bucket, B, placed longitudinally on the shaft, A, with inclined planes, a, between them, in combination with the curved or spiral buckets, C C, placed at each end of the buckets, B, and the latter encompassed by chutes, E, all being placed within a box or penstock, D, and arranged as and for the purpose specified.

Second, The inclined planes, a a, placed on the shaft, A, between the buckets, B, when used in connection with the buckets, C C, box or penstock, D, and chutes, E, substantially as and for the purpose set forth.

41,965.—Rodney L. Smith, assignor to Parkers, Snow & Co., West Meriden, Conn., for a Lamp-Burner:

I claim the wire or rod, C, attached to the under side of the base, a, of the cone or deflector, and bent so as to form a hinge, stop, and a catch or fastening, substantially as herein shown and described.

41,972.—Marshall Burnett, South Boston, Mass., for a Lamp:

I claim the connection, C, combined with the reservoir and burner, and made substantially as and for the purpose described.

41,981.—Whitman S. Dyer, Portland, Maine, for a Gas Burner:

I claim the gas burner constructed and operating in the manner described and represented as an improved new article of manufacture.

41,994.—Ezra S. Hazeltine, Warren, Pa., for a Cleaner for Lamp Chimneys:

I claim the use of an elastic pad for the cleaning of lamp-chimneys, or other glass tubes with curved or irregularly curved inner surfaces.

42,007.—Charles B. Loveless, Syracuse, N. Y., for a Petroleum Stove:

I claim, first, The use, in vapor stoves, of a valve-seat and valve made of steel, in the pipes through which the supply of the fluid takes place, in combination with the supplying and vaporizing pipes, substantially as above described.

Second, The retort pipe, g, and vapor pipe, h, constructed, arranged, and operating substantially as set forth, in combination with the retort, N.

Third, The additional vapor pipe, R, and burner, O', in combination with the protected vapor-pipe, h, for the purposes set forth.

Fourth, The deflector-plate, B, constructed and operating substantially as described, for the purpose of forming the hot-air chamber, 1, and of forming the escape-chamber, 2, as specified.

Fifth, The hot-air chamber, 1, around the cylinder, E', constructed substantially as set forth.

42,023.—Warren A. Simonds and Albert H. Silvester, Boston, Mass., and Charles Caldwell, Chelsea, Mass., for an Apparatus for regulating the Pressure of Gas:

We claim a regulator with a double leverage connected to the rod of the valve, n, as herein described.

We also claim the connection of a chain to the end of lever, 5, near ball 7, also to the centre of the oval top, L, to be operated substantially as and for the purpose herein set forth.

We also claim the attachment of a leaden ball to one end of lever, 5, for the purpose as herein specified.

We also claim the attachment of the diaphragm, F, to the rim of top L, and to the screw ring, a, the same to operate as herein set forth.

42,028.—U. D. Taylor, Fort Madison, Iowa, for a Coal-oil Lamp:

I claim the use of glass-ground stowple, A, in connection with a glass lamp, as and for the purpose substantially as herein set forth.

42,082.—Peter H. Vander Weyde, New York City, for a Gas Alarm:

I claim the construction of a gas alarm, for the protection of property, in the manner and for the purpose above specified.

42,045.—William R. P. Cross (assignor to himself, Samuel Adams, Jr., and C. H. Breed), Portland, Maine, for a Cone and Chimney Elevator:

I claim, first, The curved sliding, hinged arm g, in combination with a lamp cone d, and hinged supporting arms i, substantially as and for the purpose described.

Second, So forming and applying the arm g, to the burner and cone that it serves the two-fold purpose of a support and a lifter for the cone substantially as described.

42,059.—George L. Witsil (assignor to himself, Charles M. Rhodes and C. W. Oldenberg), Philadelphia, Pa., for a Petroleum Stove:

I claim, first, the combination of the disk C, base plate A, its openings, h, and plate, E, or its equivalents.

Second, The combination of the disk C, dome, D, and disk D', constructed and arranged within a stove or heater substantially as and for the purpose herein set forth.

42,071.—E. W. Bullinger, New York City, for a Gas Stove:

I claim the combination of the edges, b, c, with an annular gas-mixing chamber, C, and its disk, F, substantially as herein shown and described.

42,073.—John Cannon, New Richmond, Pa., for a Mode of collecting Oil on Surface of Rivers:

I claim a boom stretching across a river or a portion thereof, consisting of a trough A, or equivalent, for the purpose of collecting in a body the oil that floats on the surface, so constructed that the oil is allowed to flow in, on the upper side, while it is prevented from flowing over on the lower side, substantially as herein set forth. In combination with the trough, A, I also claim the float board, f, arranged and operating substantially as and for the purpose herein specified. In combination with the trough, A, I also claim the strainer, g, substantially as herein described.

42,083.—Richard Gilbert, Rochester, N. Y., for a Rotary Pump:

I claim first, The diaphragm, D, wings, B, and B', and shell or cylinder, A, in combination with the double pistons, P, and P', and cylinder, C, the parts being constructed and arranged substantially in the manner specified.

Second, Making the cylinder, C, with one or both of its heads, H, and H', detachable, they being attached with their inner faces flush with the outer edge of the pistons P, and P.

42,085.—John H. Hayward, New York City. Antedated March 23, 1864, for a Portable Gasometer:

I claim, first, The application of the movable piston-head or compressor, and its several parts, for the purpose of expelling the gas.

Second, The use of the double cone spring, or springs of other shape, by means of which the gas is compressed and expelled from the cylinder.

Third, The ratche-trod, with its several parts, as a means by which a steady and uniform pressure is maintained upon the gas while being expelled for consumption.

42,122.—Willard H. Smith, New York City, for a Lamp Burner:

I claim, first, The cap, e f g, constructed and applied as and for the purpose set forth.

Second, The insulator, a b c, constructed and applied as and for the purpose herein set forth.

Third, The combination of the insulators, e f g and a b c, in the same burner constructed, combined, and applied as and for the purpose herein set forth.

42,123.—Willard H. Smith, New York City, for a Wick Tube:

I claim the construction of flat wick tubes with a semi-circular orifice at the bottom, whether the base of the tube be circular or semi-circular.

I claim the wick tubes represented by figures 1 and 2, constructed as represented and for the purpose specified.

RE-ISSUE.

1,647.—Sylvester Lewis, Rochester, N. Y. Patented June 10, 1862, for a Mode of treating Oils and Fats, for rendering them more useful for burning in Lamps, lubricating Machinery, and for other Purposes:

I claim the treatment of oils and fats by the use of benzole, benzine, or naphtha, either with or without annotto combined, substantially in the manner and for the purpose described.

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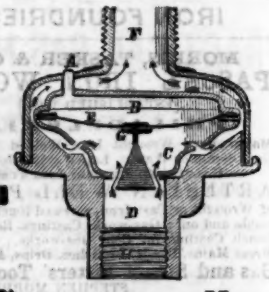

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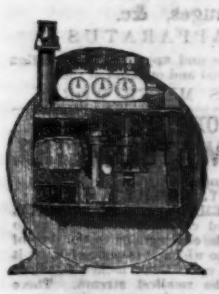

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Are prepared to supply CRUDE PETROLEUM for Domestic or FOREIGN consumption. Being ourselves large producers, and possessing Lands and the ROYALTY of numerous Wells, we can offer SUPERIOR INDUCEMENTS in furnishing CARGOES for SHIPMENT. Superior REFINED OIL supplied on orders, in wood, zinc or iron bbls. and in tin cases. Parties desiring to make foreign remittances will find the shipment of Petroleum advantageous.

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PRINCE'S METALLIC PAINT,

AN INDESTRUCTIBLE COATING FOR

IRON, TIN, and WOOD.

It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

For patching boilers and making joints, it is considered superior to red lead, or any other preparation.

For cleaning metals it takes the place of crocus, rouge, and emery, being better and cheaper.

This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Four Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

Also, Prince's Imperial Black Paint, and Prince's Protoxide of Iron.

DANIEL SLOAN, General Agent,
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Local Agents—S. R. Williams, 204 South Front st., Philadelphia.
Calvin Gay, 29 Doane st., Boston.

DRAKE'S PATENT AUTOMATIC GAS MACHINE.

THIS MACHINE, which has been in constant use for more than two years, is now acknowledged to be the

Most Convenient, Simple, and Efficient Method

OF LIGHTING BUILDINGS OF ALL KINDS, out of the reach of regular gas-works, ever brought to public notice.

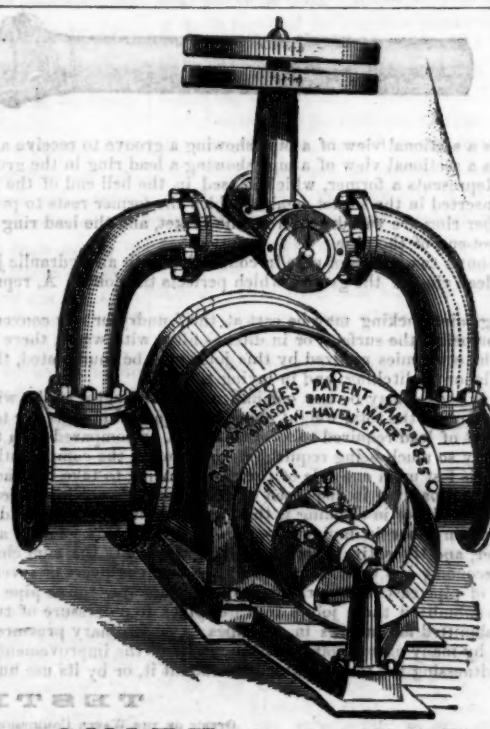
The SIMPLICITY OF THE APPARATUS, its ENTIRE FREEDOM FROM DANGER, the LITTLE ATTENTION REQUIRED, the EASE WITH WHICH IT IS MANAGED, and THE CHEAPNESS and SUPERIORITY OF THE LIGHT, has gained for it the favorable opinion of those acquainted with its merits.

The Machine takes up but little room; no disagreeable odor is experienced in its use; no fire is applied to the apparatus at all; it can be attached to ordinary gas-pipes used for coal-gas, and is burned through the same kind of fixtures.

These Machines are manufactured in Boston, by the AUTOMATIC GAS-MACHINE CO., and are for sale at their Store, 78 Washington street, Boston, and also at the Agency, MITCHELL, VANCE & CO.'s, No. 620 Broadway, New York.

For further particulars, address—

MITCHELL, VANCE & CO.,
620 BROADWAY, NEW YORK CITY.



SMITH & SAYRE,

Sole Proprietors and Manufacturers of

THE MACKENZIE PATENT GAS EXHAUSTER

AND

PATENT COMPENSATOR.

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address SMITH & SAYRE, 456 Broadway, New York.

D. PARRISH, Jr.,

GAS ENGINEER

And Contractor for Coal or Oil Gas-Works.

Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.

To Manufacturers of Petroleum Gas.

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 68 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

CLAY RETORTS.

PHILADELPHIA FIRE-BRICK Works, corner of Vine and Twenty-third streets, Philadelphia.

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Manufacturer of all kinds of Fire-Brick, Gas-House Tiles, to suit all the different plans in use. Clay Retorts and Dentists' Muffles. Orders filled at short notice.

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ROBBINS' PATENT GAS AND WATER JOINT.

THE PROPRIETORS of this unrivalled joint are now prepared to introduce it to general use, and to guarantee that, in all respects, it will fulfil perfectly all the requirements of either water, gas, or steam. It is a joint which remains in all situations absolutely tight.

The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 1.

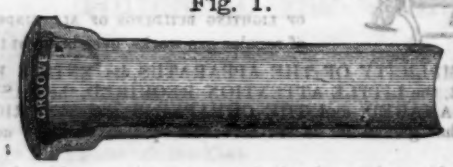

Fig. 3.

Fig. 2.

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

TESTIMONIALS.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough test of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apart and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department, I can testify to the results as stated by Col. A. J. White, and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 22d, 1863.

Gentlemen.—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint," in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.

For further information, or for prices and terms, which will be very reasonable, apply to

R. C. ROBBINS & CO.,
No. 197 GREENWICH STREET, NEW YORK.